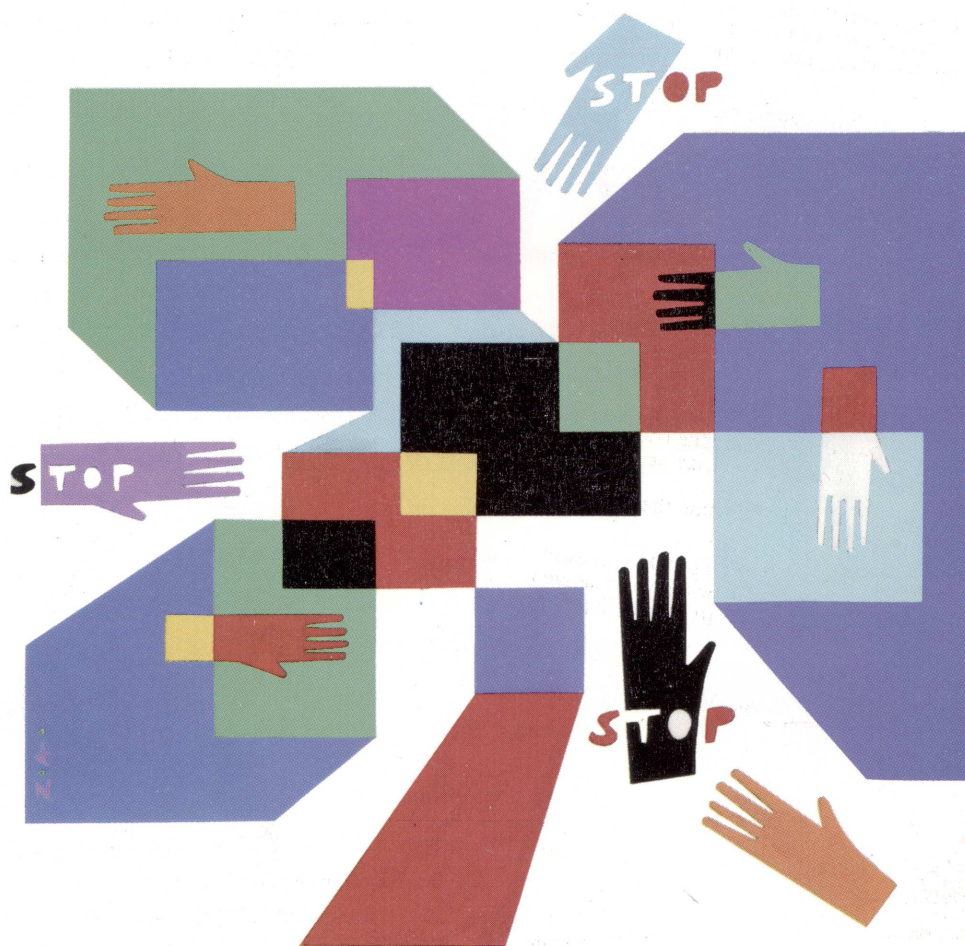


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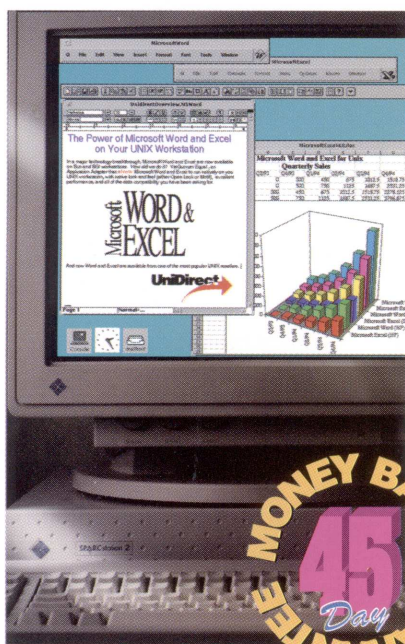
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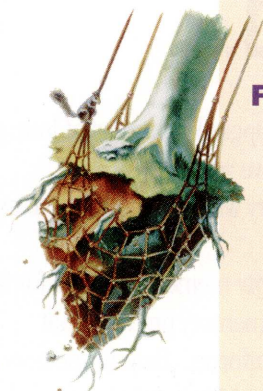
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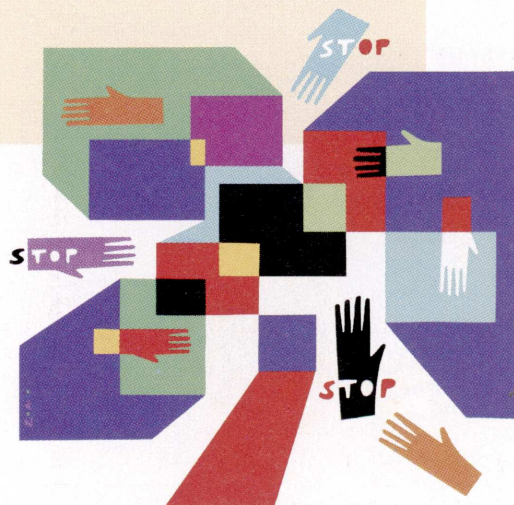


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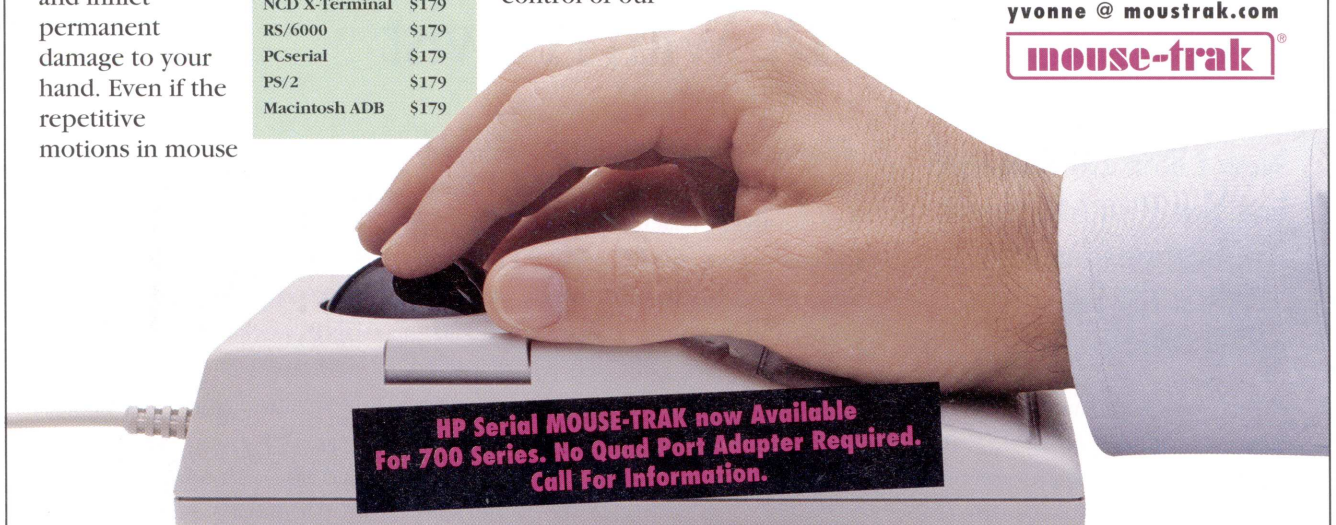
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Question & Answer

Q: My spooler has stopped working. How do I get it started again?

A: The SpoolKick Procedure:

Every once in a while, the lp spooler subsystem will appear to lock up or the spooler will consume large amounts of CPU time without printing anything. Most of the lockup problems have been solved with the 9.0 release, but occasionally, a problem may develop. Here is a series of steps that can get your spooler back online (valid for HP-UX 7.0x and higher except as noted).

1. Do an lpshut command. This requires root and the command is located in `/usr/lib/lpshut`. Now check to see if all lp processes have terminated with

```
ps -ef | grep lp
```

If you see processes such as lpsched still running, kill them with

```
kill -9
```

using the process ID number. These lpsched's are associated with printers (or scripts) that are having problems, so you may wish to note which printers are affected. The parameters passed to the model scripts will indicate the printer name.

Change directories to `/usr/spool/lp` and remove the two files at the beginning of the list: SCHEDLOCK and FIFO.

2. Once all lp processes are gone, see that all printers are online and ready to print. If a printer is temporarily offline due to a paper jam or being out of paper, use the disable command to stop the spooler from printing to that device.

Now type `lpsched` to start the spooler again. Check to see that printing is working and that nothing is hung. If all is well, the spooler is now fixed. Check on any printers that were associated with lpsched's that had to be killed manually. You may wish to start lp spooler logging to monitor spooler activity with:

```
/usr/lib/lpsched -v -a
```

This will log printer activities into `/usr/spool/lp/log` and `/usr/spool/lp/lpana.log`. `/usr/spool/lp/log` can be read with just a cat or more command, while reading `/usr/spool/lp/lpana.log` requires the `/usr/lib/lpana` command.

3. If the spooler still locks up, and you are running HP-UX Version 9.0x, you can use SAM to help fix the problem. If you are running 8.0x or earlier, skip this step.

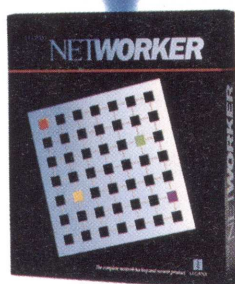
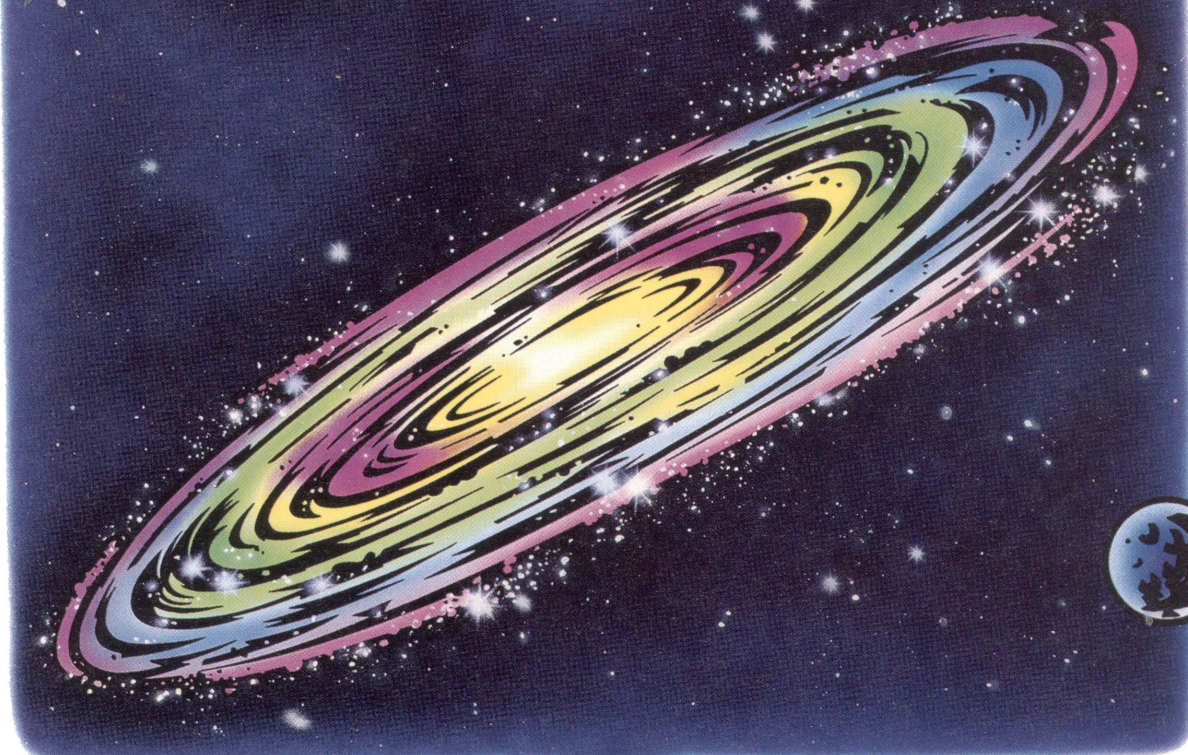
At 9.0x, a copy of the spooler control files is made whenever changes are made to the spooler using SAM. This means that the spooler can be recovered to this state using SAM's *Previously Saved State* option.

Once this is performed, start the spooler and check if all is well. Again, if problems develop, check the names of the printers that seem to be hanging the spooler to see if the printers are online. If not, use the disable command to take them out of active spooler status.

Also check the log file in `/usr/spool/lp/log`. There may be some information about the spooler problems logged there. The JetDirect software always logs activities in this file and network activities are typically logged into the file `/usr/adm/syslog` (but check the printer/plotter self test page to see if a syslog server has been established).



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4. If the spooler locks up again, there is probably data corruption in the *pstatus* file; perform step 1 again. Now we need to make a list of all the printers currently in the system. Use `lpstat -v` to get this list, and make a permanent copy by redirecting it into a file as in

```
lpstat -v > /tmp/lp.list.
```

If you are running HP-UX 9.0 Version or have the spooler patch for 7.0 and 8.0, then you'll also have a list of printers that are remote or located on other systems.

The unprinted jobs in the spooler are located in the directory:

```
/usr/spool/lp/request
```

where each printer has a directory of print jobs that have not been completed. Each job creates a pair of files: a short control file and the actual data for printing. If none of the print jobs are important, these files can be removed (details in the next step).

Otherwise, the individual data files can be moved to a temporary directory. Since many files may have been printed with special options, you should also move the control files to be used later in reprinting the jobs. If `lpstat` did not provide a list of the remote printers with their remote computer hosts, you'll need to manually create a list of these printers.

Also note: if you have made customized models scripts in the directory `/usr/spool/lp/interface`, make copies of these custom scripts into the directory `/usr/spool/lp/model` (the template directory). You may wish to rename the scripts in the interface directory since they will have the name of a printer.

Special note for JetDirect-connected printers and plotters: The model scripts for these printers are in a directory called *model.orig* one level below the interface directory. Be sure to save any customized scripts found in that directory too.

Also, the spoolkick procedure does not affect the bootp services used by JetDirect cards in this system. bootp is independent of the lp spooler.

5. With the spooler stopped, use `lpadmin -x` to remove every printer. If you have more than a few, you may wish to create a script to read the names of all the printers and run the `lpadmin -x` command automatically.

Once every printer has been removed, we need to move to the directory `/usr/spool/lp` to check on the remaining files and directories. Here is a summary of the steps:

- Remove the files SCHEDLOCK and FIFO.

- Clean the requests with:

```
rm -r /usr/spool/lp/request/*
```

Be sure to specify the `/*` at the end so that request will not be deleted.

- The following directories must exist but have **NO** files in them:

```
cinterface
class
info
interface
member
receive
request
sinterface
```

- The file: *seqfile* can be removed, or you can edit it to contain an ASCII number as the starting point for the next print request ID. (As a note, *seqfile* can be changed at other times but only when the spooler is shut down and there are no pending jobs to print.)
- The file: *default* should be zero-length.
- Zero out the status files with:

```
> pstatus (or you can use: cat /dev/null > pstatus)
> qstatus (or: cat /dev/null > qstatus)
> outputq (or: cat /dev/null > outputq)
```

Do not remove these files. If they are removed, they must be recreated as zero-length files with the correct permissions and ownerships.

- Finally, we must verify that the existence, links, ownerships, and permissions are correct. With HP-UX 8.0 and higher, there is a very useful command: `pdfck`. With this command, you can verify the entire lp spooler file set. Just use:

```
/usr/bin/pdfck /system/LP-SP00L/pdf
```

- This will report on any missing files or incorrect ownerships and permissions. Once `pdfck` finds no errors, we have completed the cleanup of the spooler. To verify that all is well, use:

```
/usr/bin/lpstat -t
```

The output should be something like:

```
/usr/bin/lpstat -t
```


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```
scheduler is running
no system default destination
```

At this point, we can add the first printer, preferably one that is close by so we can verify operation immediately. Start by testing a directly connected printer (either serial or parallel). You can use SAM to add the printer or the commands:

```
/usr/lib/lpshut
/usr/lib/lpadmin -p<prn> -v<devfile> -m<model>
/usr/lib/accept <prn>
/usr/bin/enable <prn>
```

where <prn> is a name for the printer, <devfile> is the device file, and <model> is the model script to be used from the choices in `/usr/spool/lp/model`. Then, test the printer with:

```
lp -d<printer-name> /etc/group
```

which will produce a one page (or so) listing of the group file.

LP SPOOLER PATCHES

REV	PLATFORM	PATCH
7.0	300/400	PHCO_0545 (basic spooler fixes)
7.0	800	PHCO_0543 (basic spooler fixes)
8.0	300/400	PHCO_1433 (basic spooler fixes) PHCO_1968 (OTC printers)
8.0	800	PHCO_1432 (basic spooler fixes) PHNE_3526 (X.25 printing)
8.07	700	PHCO_1437 (basic spooler fixes) PHNE_3526 (X.25 printing)
9.0	300/400	(none)
9.0	800	PHCO_3122 (basic spooler fixes) PHCO_2942 (PCL5 scripts) PHCO_3223 (hprpp and divpage) PHCO_3314 (TSM printing)
9.01	700	PHCO_3122 (basic spooler fixes) PHCO_2942 (PCL5 scripts) PHCO_3223 (hprpp and divpage) PHCO_3314 (TSM printing)

This should completely restore operation of the lp spooler. Be sure that the latest lp spooler patches have been applied. (See the /lp Spooler Patch box.)

You can obtain these patches from the HP Response Center or through electronic means by HP Support Line. For information on HP Support Line, call (415) 691-3888.

General HP-UX and 9000 questions are answered by Bill Hassell, a support engineer at the HP Response Center in Atlanta, Georgia. He can be contacted by e-mail at blh@hpuerca.atl.hp.com.

HP 9000 Workstations

Q: How many client nodes will the SRM-UX server support?

A: Through the original SRM interface (i.e., 50692A), the server will support 10 server nodes 0–9 and 53 user nodes 10–63. Through the LAN interface, the SRM-UX server will support nodes 0–9 as server nodes and up to 116 user nodes 10–26. However, you may be limited to 10–99, depending on the operating system your clients are booting. If your clients boot the BASIC/WS operating system and use AUTOST files, then you are limited to 89 clients (10–99). This is because the boot ROM will recognize only the two-digit numbers from 10 to 99 (i.e., AUTOST10 through AUTOST99).

Q: How do I change the font size of BASIC/UX?

A: Depending on your environment, there are several ways to change the font size.

1. If you are in an X11 windowed environment, the font may be changed from the command line as follows:

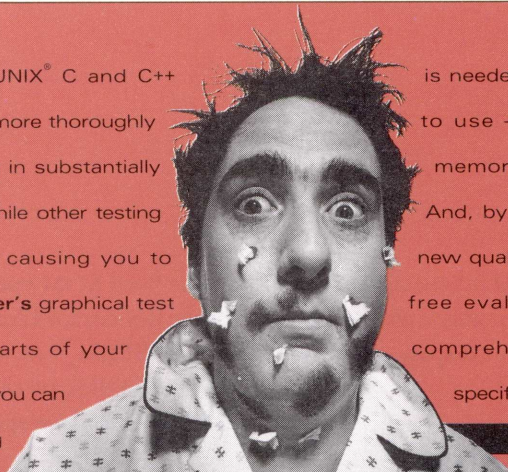
```
rmb -fn kana.10x20
```

this command will resize the window as well. You can also edit your `.Xdefaults` file and add the following line to change the font size:

```
rmb*font: kana.8x16
```

2. if you are operating in bare console mode, you must copy the desired font from one of the subdirectories located in

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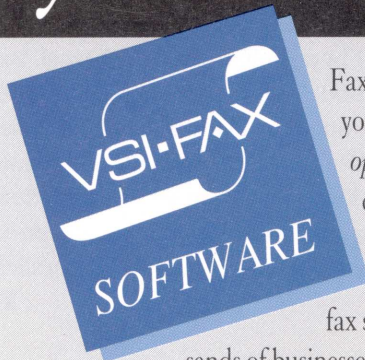
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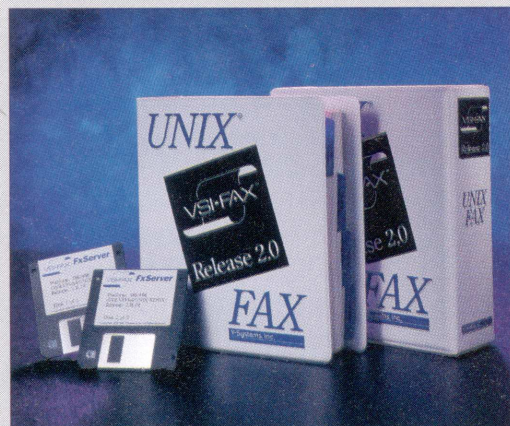
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CIRCLE 55 ON READER SERVICE CARD

`/usr/lib/raster` into the file `lp.8U.scf` located in one of the subdirectories under `/usr/lib/rmb/fonts`. For example, to get katakana characters on a high-resolution display, execute the following:

```
cp /usr/lib/raster/10x20/SNF/kana.8K.scf \
   /usr/lib/rmb/fonts/10x20/lp.8U.scf
```

The subdirectories are dependent on the screen resolution as follows:

SUBDIRECTORIES	SCREEN RESOLUTION
16x15	512x400
8x16	1024x768
10x20	1280x1024

Q: Is it possible to format floppy disks for 512-byte sectors with BASIC/WS on the HP 9133x disk drives?

A: No, the BASIC/WS operating system supports only 256- and 1,024-byte sectors. However, formatting the HP 9133x floppies to 512-byte sectors can be accomplished through both the HP-UX and HP PASCAL/WS operating systems as follows:

Under HP-UX:

```
mediainit -f 512
```

Under PASCAL 3.25:

MEDIAINIT follow the prompts and answer the formatting option question with a 2

Q: The *SRM/UX System Administrator's and User's Guide* on page 7-3 says you must have a matching `INITLIB`, `START`, and `TABLE` numbered in the same way as your bootable system file when installing PASCAL 3.24 on an SRM/UX system. That is, the system file named `SYSP33` would require `INITP33`, `STARTP33`, and a `TABLEP33`.

However, when I stored down my system file named `SYSTEM_P324` with the files `INITP324`, `STARTP324`, and `TABLEP324`, the files were not found by the system and the boot failed. What is the problem with my numbering scheme?

A: The answer to your problem is in the boot ROM. At boot

up, the boot ROM executes a routine that searches the mass storage devices for files of "System" type with names beginning with "SYSTEM_" or, with Boot ROM 3.0 and later, "SYS". However, in the case of files named "SYSTEM_" the boot ROM will read only three spaces past the "_" in the file name:

SYSTEM_xxx where xxx are your system identifiers

The boot ROM would see only `SYSTEM_P32` of your system file of `SYSTEM_P324` and would then search for `INITP32` instead of `INITP324`, which it would fail to find, and then fail the boot.

The format for boot ROM 3.0 and later is as follows:

SYSTEM_xxx and SYSxxxxxxxx

Q: Is there a command in BASIC/UX 6.2 that will return the current working directory like the "pwd" command in HP-UX?

A: Yes, you can use the following command from the command line and programmatically:

```
SYSTEM$( "MSI" )
```

Q: When I run BASIC/UX on a client node, the lp spooler stops spooling to the parallel port. If I quit BASIC/UX, the spooler starts working again. Why or how does BASIC/UX prevent the lp spooler from working?

A: The reason you are experiencing a problem is that one of the cnode's kernel parameters is set too low. The parameter is "ndilbuffers," which is set to 1 by default in a cnode's kernel. You should, using sam, set the cnode's ndilbuffers to a value of 30.

The ndilbuffers define the number of DIL device files that you may have open at one time. When you kick off BASIC/UX, it uses up the 1 ndilbuffer that the kernel has been set to, which does not allow the lp spooler to open another for the parallel port.

The interfaces that require ndibuffers are HP-IB, parallel, and gpio. ■

Rudy Stanley, an applications support engineer with the HP Response Center in Atlanta, Georgia, answers HP 9000 workstation questions.



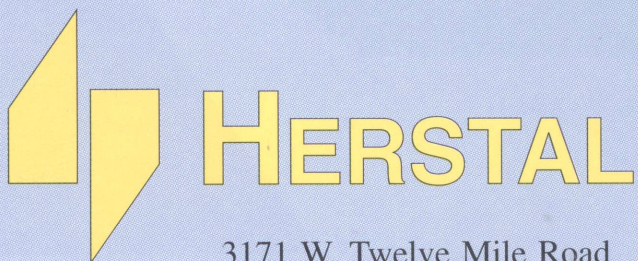
23:30

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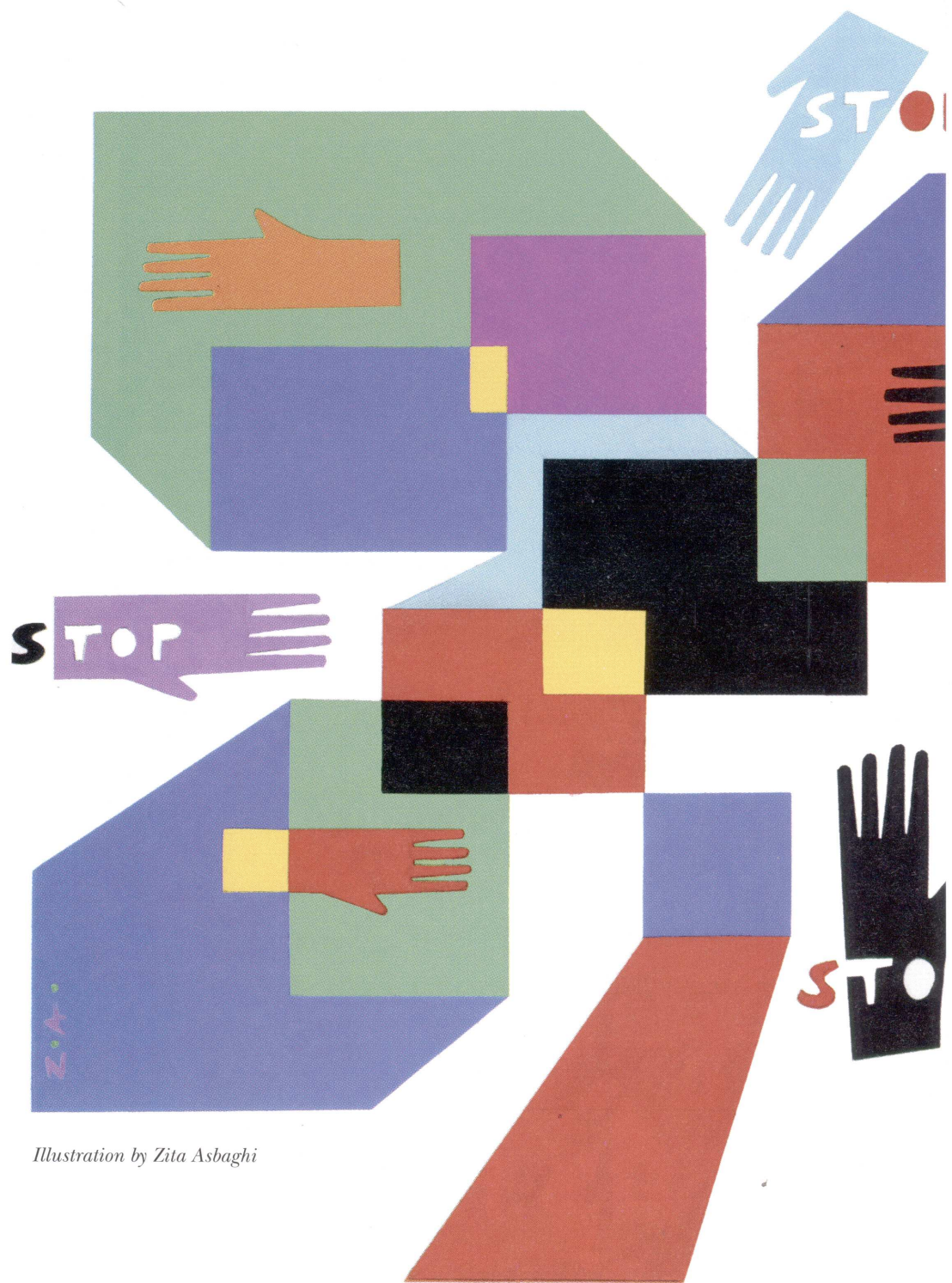


Illustration by Zita Asbaghi

Customizing an HP-UX System:

Using UNIX systems in a university open network requires many security checks not provided by standard UNIX. First, for each user we need to handle a set of allowed resources (for example, devices) with an allocate-deallocate mechanism to provide exclusive access to any one of them.

Second, we need to allow or deny login access depending on the current host, the user's login name, and the origin of the request (remote host or domain name, terminal or modem line). The user's environment initialization must be a function of these parameters.

Third, we must increase the super-user security because of the density of hackers among the students!

Obviously, no user but root must be able to modify the access rights.

This article discusses the choices we have made to describe the user's resources and the host's login permissions. It will present the mechanism used to handle distributed resources in the local network. It will also present the set of tools we have developed to manage and use all this information, and explain how we have decreased the login delay, while increasing the number of security checks.

The Problem

The **CEGELY** (Centre de Génie Electrique de Lyon) is strongly involved in two directions: first, it is the Department of Electrical Engineering of the Ecole Centrale de Lyon, an important place for the training of engineers; second, it is a research laboratory that has been working for several years in the domain of electro-magnetic fields modeling and high-voltage phenomena. One of its main activities is the development of three dimensional computer aided design software packages. It is also one of the 10 European universities that participate in the COLOS project (COncceptual Learning Of Science), a project initiated by Dr. Zvonko Fazarinc from Hewlett-Packard laboratories (Palo Alto).

by Luc Mariaux

These activities impelled the CEGELY to equip itself with computers. The first one was an HP 1000 (1976), which was replaced with an HP 9000/840 (1988). The acquisition of several workstations completed this configuration. The actual network is made up of 15 workstations, used both by research people and by students. All this equipment is connected to the main campus network, which is itself bound to the Internet.

In such a context, different kinds of users must have access to our machines:

- For some specific courses, we need common teaching accounts usable by any student to execute specific application software. These accounts do not have a password, so the access must be restricted to local connection; no remote login can be accepted.
- For some students (who work on a project in our department, for example), we have to set up private accounts, but with limited access possibilities. We want to allow such connections from anywhere in the campus, but not from outside.
- For research students, we have also to set up private accounts, but with higher level access rights. Some of them need to be able to log in from a company network.
- For teachers and research workers, the rights must be wider, and the connection must be possible from anywhere in the world, but with a high security level.

When a user is connected to one of our machines, we need also to prevent him from accessing all installed software. Because of the confidentiality of the research projects, some software is prototype and must be restricted to a closed group of persons. For the same reason, it is important to take care of exclusive access to devices such as tape cartridge or floppy disk units, to avoid unexpected reading of confidential data.

The problem to be solved appears to be divisible into two main parts:

- the control of access to our computer network from the outside world
- the management of access to a set of system resources

We will first look at what can be done using standard HP-UX commands and what the limitations of these solutions are; then we will show how the problem can be approached to define the necessary information and programs needed to build a complete and coherent solution. We will describe the

functionalities of the tools created, but not the details of their programming.

Our goal is not only to explain the solution of our problem but also to provide an example of what can be done to solve system problems in the UNIX world.

Solutions Using Standard HP-UX Tools

The standard HP-UX system provides a set of tools that implements the C2 security level. Obviously, in most current environment cases, these tools could be sufficient to realize sufficient protection.

Login protection

Each user who wants to connect to a UNIX system needs an account described in the file `/etc/passwd`. At login time, the security check is made using a **password** associated with each login-name. In addition it is possible to associate some communication lines with a second password named **dialup-password**. This is made using the files `/etc/dialups` and `/etc/d_passwd`. This second password is independent of the user who tries to connect; it depends only on the command used by this user as a login shell.

Network access protection

When the system is connected to a network, the superuser must declare the allowed services and the access restrictions for each of them. For all services handled by the `/etc/inetd` daemon, this is done using the `/usr/adm/inetd.sec` file to allow or deny connection, depending on the origin of the request in terms of node or network domain.

File protections

The access rights of a user depend on his user-id and group-id(s). It is possible for a user to belong simultaneously to several groups, in which case his access rights are the sum of those of all these groups. On the other side, each file in a UNIX file system is owned by a **user-id** and a **group-id**. Its mode defines its type and contains three sets of **read/write/execute flags**, one for the user-owner, one for the group-owner, and one for other users. An optional **Access Control List (ACL)** extension allows adding some triplets (user-id / group-id / flags) to the file properties.

Limitations of these protections

Login access is correctly protected using standard security

as long as all accounts have a password, but the standard network protections do not provide an easy method to allow or deny access for a specific user depending on the origin of his connection request. The only way to solve this problem is to add checks in the `/etc/profile` or `/etc/csh.login` files, but such controls dramatically increase the time needed to be connected. This time can be as much as one minute and a half!

Concerning file access security, the coordinated use of group membership and Access Control List provides a good tool as long as the number of groups and the number of users are small. When these values increase, two critical limitations are reached:

- a user cannot belong to more than 20 groups
- a file cannot have more than 20 ACL entries

Last, the exclusive device access cannot be easily realized using standard UNIX tools and without additional programming.

Overview of the New Solution

The limitations described above lead us to create a set of new tools intended to be used in conjunction with standard ones and to enable the missing security checks and resource management in a very efficient way. The main purposes of these tools are:

- to control the origin of each login request
- to allow specific user-dependent login operations
- to control access to resources

To achieve this goal, we have divided the needed information into three separate series of data concerning, respectively the network access rights, the user-related parameters, and the system resources description. Here is the list of the functions in the proposed system, with the associated commands and data files:

<u>function</u>	<u>command</u>	<u>data file used</u>
security checks	logininit	<code>/etc/access.allow</code>
and initialization of		<code>/etc/access.deny</code>
standard environment		<code>/.secure/etc/d_passwd</code>
at login		<code>\$HOME/.envir_data</code>
		<code>/etc/ENVIR_NORMAL</code>
		<code>/etc/ENVIR_RESTRICT</code>
user environment initialization	envinit	(no specific data)
second password changing	dpasswd	<code>/.secure/etc/d_passwd</code>

access rights checking	accessrights	<code>/.secure/etc/d_passwd</code>
resource allocation	allocate	<code>/.secure/etc/d_passwd</code>
		<code>/etc/RESOURCES</code>
system resource allocator	devallocate	<code>/etc/RESOURCES</code>
execution of a protected	protectexec	<code>/.secure/etc/d_passwd</code>
program		

Description of the Needed Data

The network access rights

Files:

`/etc/access.allow`
`/etc/access.deny`

Mode: `r--r--r--` Owner: root

These data associate the user's login-names with the origins of allowed login requests. They can be modified by super-user only. The syntax of each line of these files is:

user-name: [origin . . .]

Each **origin** value can be either a **tty-line**, a **node-name**, or a **network-domain**. In this last case the domain name must begin with a dot. The **user-name** can be replaced by the string "**ALL_OTHERS**" to associate origins with all remaining user names. This value is allowed only on the last line of the file.

An example of the `/etc/access.allow` file:

```
john:      hplabs.hp.com    test.stanford.edu
suzy:      tty0p4          .stanford.edu
ALL_OTHERS: hplabs.hp.com
```

and the `/etc/access.deny` file:

```
john:      console        ttyd00
```

These two files used together will give the following rights:

- John is allowed to connect from any node in the domain hplabs.hp.com and from the node test.stanford.edu, but not from the local `/dev/console` and `/dev/ttyd00` (modem) lines.
- Suzy is allowed to connect from any node in the domain stanford.edu and from the local `/dev/tty0p4` line.
- All other users are allowed to connect from any node in the domain hplabs.hp.com.

The user-related parameters

File:

`/.secure/etc/d_passwd`

Mode: `r-----` Owner: root

This information appears to be an extension of what is described in the `/etc/passwd` and `/.secure/etc/passwd` files. The `/.secure/etc/d_passwd` file is hidden and is accessible only to the superuser. For each user, there is a line in this file with the following syntax:

```
user-name:password:flag:resource-list:
                                mail-lists:quotas:comment
```

The **password** field contains an encrypted secondary password. It can be empty if no such password is used, or it can contain "*" to deny access. This field is used in conjunction with the **flag** field, which can be 'A', 'N', or 'D'. The value 'A' means that the secondary password always must be used. The value 'N' means that it must be used for each login request from a host other than the current one. The value 'D' means that it must be used for each login request from outside the current network domain. It is always used from a modem line. These two fields can be modified by the user except if the password field is a "*" (see *dpasswd* below).

The **resource-list** field specifies the set of resources allowed for this user. It is made up of a series of comma-separated words.

The **mail-lists** field specifies the names of all the mailing lists in which this user must be placed. It is also a series of comma-separated words.

The **quotas field** is made of four integer values giving respectively the block-soft, block-hard, inode-soft, and inode-hard limits intended to be used in the disk quotas system.

The comment field is free for system specific information.

These last four fields can be left empty.

An example of such a record:

```
motor:Azk7xcV0oPLwS:D:tape,dat,model:
                                all,student:1000,1500,400,600:john
```

The user motor uses a secondary password from outside the local domain.

He is allowed to use the tape, dat, and model resources.

He is in the mailing lists all and student.

His disk quotas are for blocks: soft 1000 hard 1500
 for inodes: soft 400 hard 600

As a comment, his responsible teacher is john.

System resources description

File:

`/etc/RESOURCES`

Mode: `r--r--r--`

Owner: root

These data are used to describe system resources that require special management. Each of these resources needs a line in this file, the syntax of which is:

```
resource:alias:class:allocate:server:device:sharing
```

The **resource** field contains the name of the resource. The **alias** field allows the use of a short name for this resource.

The **class** field contains the class of the resource. It is used in conjunction with the **resource-list** field of the `/.secure/etc/d_passwd` file to allow or deny this resource for a user.

The **allocate** field contains **yes** or **no**. It indicates whether or not the resource needs to be allocated before use.

The **server** field contains the node name of the computer on which the corresponding device is physically connected.

The **device** field is the name of the special file for this device.

The **sharing** field contains a comma-separated list of special files sharing the same physical device. It can be empty if there is none.

An example of such a record:

```
32_tracks_cartridge:C32:tape:yes:jupiter:/dev/9145:
```

The 32-tracks cartridge-unit with alias name C32 belongs to the resource class named tape and is physically connected as device `/dev/9145` on node jupiter.

The Login Processing

As noted above, adding a lot of checks in the `/etc/profile` or `/etc/csh.login` scripts would dramatically slow down the login action. Nevertheless, because we do not want to modify the standard login command, it is obvious that our specific operations must take place at this level. The solution is to perform all the initializations in a unique process called from the profile script. The new `/etc/profile` script now looks like:

```
#!/bin/sh
# bourne shell or korn shell main profile
trap "" 1 2 3
eval ` /etc/logininit `
trap 1 2 3
```

In the explanations below, the examples are for the Bourne shell or Korn shell, but all described new commands intended to work with an **eval** can automatically adapt their output if the login shell is a C shell (see the *HP-UX Shells Users' Guide*).

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```
umask 077;
TZ=MET-1METDST;
TERM=hpترم;
LOGNAME=root;
SHELL=/bin/sh;
HOME=/ud01A/root;
MAIL=/usr/mail/root;
NODE=jupiter;
MASTERHOST=uranus.ec-lyon.fr
SERIES=800;
BIN=bin800;
LOGDATE=0325165793;
PATH=.:/ud01A/root/lbin:/ud01A/root/bin:/ud01A/root/../lbin:/ud01A/root../bin:/usr/contrib/lbin:/usr/
contrib/bin:/bin:/usr/bin:/usr/local/bin:/usr/contrib/tbin:/etc;
MANPATH=/usr/man:/usr/contrib/man:/usr/local/man;
EDITOR=vi;
COLOS=/ud01B/colos;
export TZ TERM LOGNAME SHELL HOME MAIL NODE MASTERHOST SERIES BIN LOGDATE PATH MANPATH EDITOR COLOS
set loginShell
```

The /etc/logininit command

Syntax:

logininit

Mode: r-s r-s r-x Owner: root Group: mail

The **/etc/logininit** command executes all the security checks, then it builds and writes on its standard output unit all the shell commands needed either to log out immediately if access is denied or to initialize the standard environment. It also writes all the login information messages on its standard error unit.

The box above shows what is written on standard output.

All the environment variables from TZ to LOGDATE are automatically built using the current context. The others are set according to a configuration file. If the login shell is a restrict shell (/bin/rsh or /bin/rksh), the **/etc/ENVIR_RESTRICT** file is used. If it is a normal shell, the private file **\$HOME/.envir_data** is used if it exists, otherwise the default file **/etc/ENVIR_NORMAL** is used. (See the box "Syntax of the

Environment Files".)

The **MASTERHOST** variable is an important element of the security system. It contains the origin of a remote connection as detected from the **/etc/utmp** file, but unfortunately there is no easy (and fast) way to have recursive information about the origin of the connection on the remote host [utmp(7)].

Below is an example of what is written on standard error. In this part, there is first the optional request for the secondary

Secondary-password:

```
°3°&a8C°1°&a16C°1°&a24C°1°&a32C°1°&a40C°1°&a48C°1°&a56C°1°&a64C°1°&a72C°1
Login successful ... Thu Mar 25 16:58:18 1993
Last logout ... Tue Mar 23 19:32:40 1993
```

Welcome on network ec-lyon.fr node : jupiter

< HP-UX / HP 9000 Series 840 >

SYSTEM MESSAGES

The plotter 'plot01' is not available today

#####

=== WARNING: YOU ARE SUPERUSER ===

root have mail

password, then if the connection is allowed, the initialization string for the current type of terminal (in this example an HP terminal, ° = escape), followed by the login information messages, then a copy of the files */etc/motdbanner* (system banner), */etc/motd.site* (cluster messages), */etc/motd* (host messages), and *\$HOME/.motd* (user messages), if they exist, and last the information about mail and news.

If the secondary password is not used, the user is not asked for. If it is used and the password given as secondary password does not allow a connection, the only message written on the standard error unit is "Access denied," and on the standard output unit "logout."

The */usr/contrib/bin/envinit* command

Syntax:

envinit [-pdDswmrSCHXMLc] [-k|K file]

Mode: *r-xr-xr-x* Owner: root

Applying the same idea of replacing a shell script (or a part of it) with a unique process unique to the user private profile *\$HOME/.profile* (or *\$HOME/.login*), the */usr/contrib/bin/envinit*, is provided to realize the most often used optional initializations. This command can also be used from the *\$HOME/.x11start* file. The requested operations can be selected using the options described in the box "Options of the */usr/contrib/bin/envinit* command."

Here is an example of what is written on the standard output when using options "*-dsHw*" from an X11 terminal window :

```
DISPLAY=uranus.ec-lyon.fr:0.0;
export DISPLAY;
SCREEN_WIDTH=1280;
SCREEN_HEIGHT=1024;
export SCREEN_WIDTH SCREEN_HEIGHT;
HPTerm_MAX_COLS=139;
HPTerm_MAX_LINES=66;
export HPTerm_MAX_COLS HPTerm_MAX_LINES;
COLUMNS=80;
LINES=24;
export COLUMNS LINES;
```

The */usr/contrib/bin/dpasswd* command

Syntax:

dpasswd [user]

Mode: *r-sr-xr-x* Owner: root

This command allows any user to change his own secondary

password and flag. The user is first asked for the current secondary password and, if his reply matches, twice for the new one. For normal users, this change is not allowed if the active secondary password is "*". The optional user-name specification is allowed only to superuser.

Resource Access Processing

As described above, a list of allowed resources is associated with each user. These resources are of two different kinds:

- resources that need exclusive access (devices, for example)
- resources that need restricted access (specific programs, for example)

This section will show how these two kinds of resources are handled by our system.

The */usr/contrib/bin/accessrights* command

Syntax:

```
accessrights [-v] [-u user] resource
accessrights [-vl] [-u user]
accessrights [-vQ] [-u user]
accessrights [-vL] resource
```

Mode: *r-sr-xr-x* Owner: root

This command searches for the requested resource in the list from the */secure/etc/d_passwd* file. It returns a "zero" if this resource is allowed, and a "one" otherwise. The available options are described in the box for this command.

The */usr/contrib/bin/allocate* command

Syntax:

```
allocate resource
deallocate resource
```

Mode: *r-sr-xr-x* Owner: root

The **allocate** command provides a way for a user who needs a particular resource, generally a device, to modify ownership and mode protection of the associated special file to get exclusive access to it. This is achieved using two user accounts named **free** and **lock**. The normal state of a resource special file is to be owned by **free** and to have a mode of zero. When the resource is allocated to user john, the special file is given to john and its mode becomes read/write for owner only [chown(2), chmod(2)]. When several special files share the same physical device, when one of them is allocated, the ownership for the others is changed to **lock**. If a user tries to allocate a resource already allocated to another user, he is asked to try again later.

The **deallocate** command releases a previously allocated resource. Only the actual owner of a resource can release it.

Here is an example of free state:

```
c----- 1 free root 4 0x070400 Mar 25 17:07 /dev/dos_A
c----- 1 free root 4 0x070410 Feb 18 10:23 /dev/dos_B
b----- 1 free root 0 0x070400 Nov 27 1991 /dev/dsk_Left
b----- 1 free root 0 0x070410 Dec 13 1991 /dev/dsk_Right
c----- 1 free root 4 0x070400 Dec 13 1991 /dev/rdisk_Left
c----- 1 free root 4 0x070410 Mar 8 14:11 /dev/rdisk_Right
```

and with the resource dos_A allocated to john:

```
crw----- 1 john root 4 0x070400 Mar 25 17:07 /dev/dos_A
c----- 1 free root 4 0x070410 Feb 18 10:23 /dev/dos_B
b----- 1 lock root 0 0x070400 Nov 27 1991 /dev/dsk_Left
b----- 1 free root 0 0x070410 Dec 13 1991 /dev/dsk_Right
c----- 1 lock root 4 0x070400 Dec 13 1991 /dev/rdisk_Left
c----- 1 free root 4 0x070410 Mar 8 14:11 /dev/rdisk_Right
```

The /etc/devallocate command

Syntax:

```
devallocate [-vrE] [-u user] resource
```

```
devallocate -C [-E] resource
```

Mode: r-x----- Owner: root

The management of resources takes care of the network. This is achieved through the **devallocate** command, which handles the allocation of devices on the current host. This command is directly usable by superuser only, but is executed from the allocate or deallocate command. If such a command is used on a different node from the server for the requested device, devallocate is remotely executed on this server. The options for this command are described in the devallocate command options box.

When resources do not need to be allocated, for example in the case of an executable program, the problem is to allow a user access to a file that has no standard UNIX permission on it. To solve this problem, we allow a user to belong simultaneously to several groups, but to avoid the limitations described above, we created a tool that is able to change dynamically the active group list of the current user depending on the program he wants to execute.

The protection system is built on a directory tree with specific access rights:

The `/usr/contrib/pbin` directory belongs to the user **root** and has the mode **rwxr-xr-x**. This directory is intended to be put in the PATH variable for all users. This implies read and execute permission for everyone.

The `/usr/contrib/protectbin` directory belongs to the user **root** and to the group **protect**; it has the mode **rxr-x--**. It is intended to contain a set of subdirectories associated with the classes of resources.

The `/usr/contrib/protectbin/class` directory belongs to the user **root** and to the group **class**; it has the mode **rxr-x--**. Its purpose is to contain all the protected executable programs associated with the resource class named **class**. This implies that for each class of resources used in the `/.secure/etc/d_passwd` file, a subdirectory of `/usr/contrib/protectbin` and a group in `/etc/group` must exist with the

same name.

The `/usr/contrib/pbin` directory must be placed in the **PATH** variable for all the users.

To set up a protected program named, for example, **modeling** in the class named **class**, the program must be copied in the subdirectory `/usr/contrib/protectbin/class` where it must belong to the group **class** with the mode **rwxr-x--**. In the `/usr/contrib/pbin` directory, a link named **modeling** must be made on the **protectexec** command, which will provide a unique way to execute the protected program. The only limitation is that the name of a protected program must be unique in the whole `/usr/contrib/protectbin` subtree.

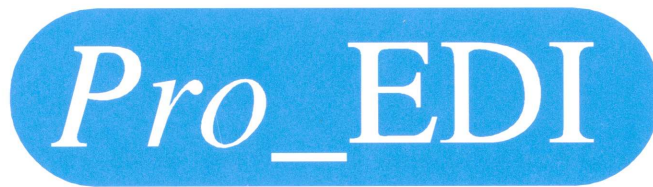
The /usr/contrib/pbin/protectexec command

Syntax:

```
protectexec
program-name [program-options ...]
```

Mode: r-sr-sr-x Owner: root Group: protect

This process is never used with its own name, but with the name of one of its links. It gets from its command line the name used to execute it (in our example **modeling**). Then it searches in all the subdirectories of `/usr/contrib/protectbin` for a program with this name (the result must be unique: see



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the limitation above). The subdirectory where it is found determines the class of the program resource. The next step is to verify if this resource exists in the list of access rights for current user. If yes, the current protectexec process modifies its own group ownership and does an **exec** of the program found (in our example `/usr/contrib/protectbin/class/modeling`) [`setgroups(2)`, `setresuid(2)`, `setresgid(2)`]. If not it writes "Access denied" on its standard error output and terminates.

Other commands

The management of available data needs some additional commands that are not covered here. For example, a

SYNTAX OF THE ENVIRONMENT FILES

This is the description of the syntax for the `/etc/ENVIR_RESTRICT`, `/etc/ENVIR_NORMAL` and `$HOME/.envir_data` files that are used to customize the environment variables initialization.

Each record is made of two or more lines. The first one must begin at its first character with the name of the concerned variable optionally followed by a flag. The next line must begin with a `<tab>` character and contain the value for the variable. If the variable is an array, it must have as many lines beginning with a `<tab>` as the array has elements. Usage of previously defined variables is allowed in the values. If the value is a full pathname, its existence is tested before it is set in the variable value. This control is suppressed if the flag in the beginning line has the value **nocheck**.

Here is an example:

standard environment values

PATH

```

    /usr/contrib/lbin
    /usr/contrib/bin
    /usr/local/bin
    /usr/bin
    /bin
    $HOME/lbin
    $HOME/binSSERIES

```

MANPATH

```

    /usr/man
    /usr/contrib/man
    /usr/local/man
    $HOME/man

```

EDITOR

vi

command named `/etc/checkaccessfile` is intended to control the `./secure/etc/d_passwd` file. Another one named `/etc/build-maillist` extracts the mailing list information from this last file and produces output suitable for the `/usr/lib/aliases` file.

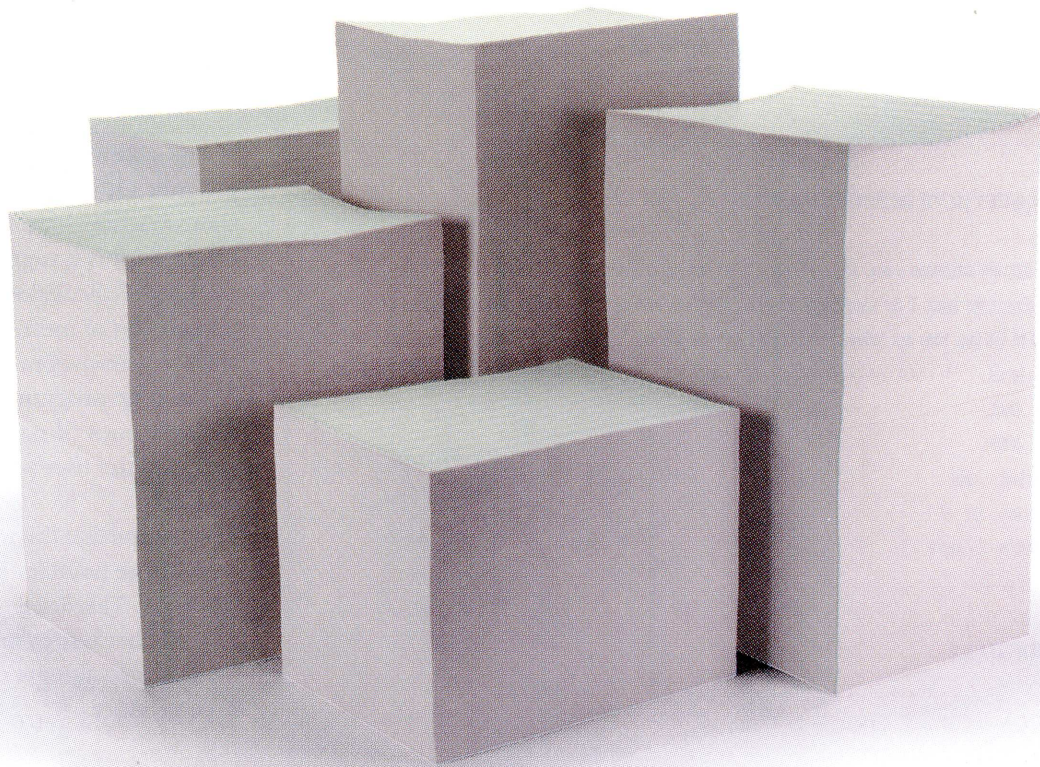
Conclusion

This system is installed on our network and it allows us to control access in a very efficient and easy way. Students can use teaching accounts without password only from the main console of the local host, while some other users can connect themselves on their accounts from Edinburgh or from California, depending on their access allowance. In adding these connection checks, the time needed to be connected had been reduced to about 10 seconds!

On the other hand, the implementation of secured devices allows us to prevent unauthorized persons from reading and writing cartridges or disks without control of what information they transfer, while we get increased confidentiality of such transfers for authorized persons who use the exclusive

OPTIONS OF THE /USR/CONTRIB/BIN/ENVINIT COMMAND

- k *key_file* sets the soft keys of the terminal (HP)
see the *key_file* syntax in the soft keys Syntax box
- K *key_file* sets the soft keys of the terminal (HP) without displaying them
- p sets the PATH variable
- e set the environment from the environment data file
- d sets the DISPLAY variable
uses the same method as MASTERHOST
- D sets the DISPLAY variable
prevents the soft keys from being displayed if DISPLAY is successfully set
- s sets the display size variables in pixels
- w sets the window size (LINES and COLUMNS) variables
- n suppresses the default autologout of 60 minutes for C shell
- r resets the tty line parameters
- S gives an output in shell syntax
- C gives an output in C-shell syntax
- H sets the maximum HPTERM size variables
- X sets the maximum XTERM size variables
- M sets the minimum of the two previous size variables
- l limits the swHXM options output to vertical values
- c limits the swHXM options output to horizontal values



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SYNTAX OF THE SOFT KEYS DESCRIPTION FILE

Each line of this file describes a key. The first character of the line is the number of the key (1 to 8). Next there is the flag (L for local, T for transmit, N for transmit without carriage return). The next 16 characters are the label of the key. They are followed by a slash character and the string to be associated with this key.

Here is an example:

```
1T exit /exit
2T date /date
3T who is logged /rwho
4T system status /ps -ef
5T pipe to display / | more
6L /
7L /
8L CLEAR DISPLAY/hcj
```

access system. The usage of protected programs is very easily controlled, and some teachers have found a new application of this system: they control the amount of calculation time spent by certain groups of users, associating several classes of resources to different copies of the same program compiled with different values of parameters, and dispatching the user access rights to these classes.

We hope that this work will be used as a departure point for improvements and new tools. This development is obviously ongoing because in the computer world no software can ever be considered a final product. ■

OPTIONS OF THE /USR/CONTRIB/BIN/ACCESSRIGHTS COMMAND

- u *user* specifies the user to be checked (default is current user)
- l lists the allowed resources for a user
- Q lists the quota values for a user
- L lists the users who have allowance for this resource
- v requests verbose mode

OPTIONS OF THE /ETC/DEVALLOCATE COMMAND (ROOT ONLY)

- r releases the resource
- v requests the verbose mode
- u *user* specifies the user for the current request
- E writes the output status value on the standard output
- C releases unconditionally all resources on current host

After studying computer science engineering at the INSA of Lyon (National Institute for Applied Science), Luc Mariaux participated as a technical project manager in the realization of a real-time executive operating system. He joined the CEGELY in 1974 to install and operate data measurement and analysis systems. He is in charge of all its computing environment and is also technical expert for the whole campus network.

He is one of the founders of the CEDRAT-Recherche company, which specializes in CAD packages. He is one of the authors of the CAO-BIBS library, a set of tools to produce text and graphical user-interfaces for CAD software written in FORTRAN. He works in the COLOS team on the creation of Motif widgets.

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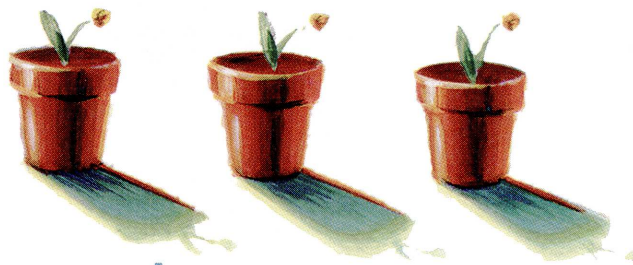
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Understanding Paging and Swapping

The messages “Out of Memory” and “Not enough swap space” or similarly worded messages are seen by most users running large or numerous applications on their HP 9000 Series 800 Business Servers and sometimes on HP 9000 Workstations. Yet many system administrators are confused as to the meaning of these messages and how and when to take corrective action. Many administrators are especially upset because they know that they have far more memory than is needed for their applications, yet still get the message.

Why the Messages?

Both messages generally are caused by the same problem—not enough swap space configured for the operating system. However, this message can occur even if not a single byte of swap space is actually used by the system. In order to understand what to do about the message, it is important to understand why it occurs.

by John A. Pezzano

What Is Swap Space? Why Do I Need It?

When an operating system like HP-UX runs, it allows processes to be larger than the actual size of memory on the machine. Not only that, it allows more processes than it has memory for. In order to do that, it has to use two memory management techniques known as *paging* and *swapping*.

To understand paging and swapping, one must understand the nature of an executable program. Basically, a program has up to four parts. They are:

- Program Text
- Program Data
- Shared Library
- Shared Data

The program text, also called code, consists of the executable instructions for the program. These instructions are never modified except by compiling or loading a new version of the program. While the program runs, its instructions do not change. This is important to understand because if the system ever needs a part of the executable instructions of a program, it can always go out to the disk file where it exists and load in a copy from where it found the original. The text size of a program does not change while it is executing.

The program data consists of the information that is modified or may be modified inside a program. This can consist of individual bytes or arrays of numbers or characters. An executing program can always ask the system for more data space (although it may not get it).

Shared libraries consist of those common routines that multiple different processes use. They are attached to the program only at execute time and not only make for smaller programs in memory but save disk space. Each executable on disk does not need to have a copy of the routine embedded in it.

Shared Data is a data area that the process has requested to share with other associated programs to pass information quickly or share information with them.

Process Startup

When you execute a process by typing its name, the system needs to find memory big enough to hold it. Since there are a lot of processes and not enough memory in most cases, the system loads into memory only the minimum amount needed to execute the program. The assumption is that programs often contain routines and data that rarely get accessed. Therefore, initially only one page of code is loaded. As soon as a program starts using its data area, the system loads or creates another page of memory for it. As the program

executes code in other pages or needs more memory, the system assigns these pages. Thus while a program may be defined to use huge amounts of code and data, only those pages necessary are loaded. This permits the system to have multiple large programs in memory at the same time.

However, the time comes when the running processes need more space than is available. At this point the system must start removing portions of text and data of various programs that are not currently executing because they are waiting on a resource such as data from disk or terminal. For data that has been modified, the system will write out these pages to an area on disk reserved for swap. For text pages, since they are never modified, the pages are simply freed up as the system can always get a fresh copy from the executable program. The process of loading in or removing parts of programs is called paging. The process responsible for freeing up memory pages is *vhand*. If you do a *ps -ef* command, you will see the *vhand* program. Its job is to try to free up memory before the system needs it,

and *vhand* tries to keep free pages available for future use. *Vhand* runs four times per second under normal circumstances but will run more often if the system finds it is short of free memory.

Deactivation

In addition to paging and swapping, HP-UX 8.0 also did process deactivation. If things got really bad and even swapping didn't help, processes were deactivated—they were just stopped for a while. Thus their pages were eligible to be used for other processes and they were paged out as the space was needed. This was removed at Revision 9.0. In a future release, there is consideration being given to using deactivation rather than swapping since, instead of one large time block being used to remove a large program from memory, many smaller but less noticeable time intervals are used to page out the process slowly.

Paging

Since a program's data may be paged to disk at some time in the future, the system needs to make sure there is enough disk space in which to put it. Otherwise, the program will have to be aborted because there is no place to go. To

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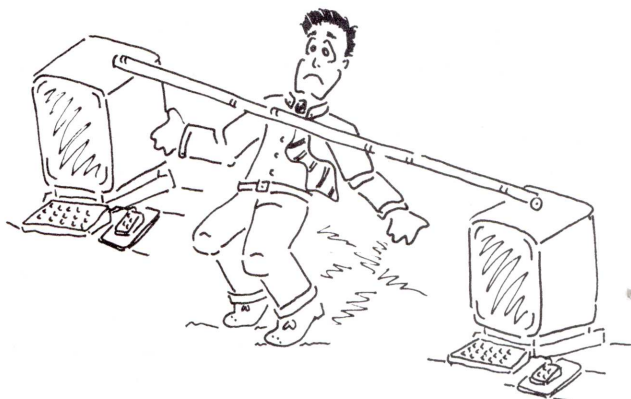
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avoid this possibility, HP-UX reserves sufficient swap space for the program's data as soon as it is started. So although no process may ever have to be paged, the system tries to ensure that there is enough space should it become necessary. Therefore, even though swap space is unoccupied, the "Not enough swap space" message can occur because the system thinks that there would not be enough swap space should it need to page out the program.

If the program dynamically asks for more data, the system does not allocate additional swap space, so it is possible that a process might not have enough space available. Unfortunately, since swap is reserved by total number of pages for all programs, but not allocated, the program that dynamically allocates memory may take the space of one that has it reserved and the other process is aborted when the system runs out of space.

Swapping

Paging programs may not be sufficient to permit processes to run. Eventually, if there are too many processes and not enough memory, the system may start thrashing. This occurs when the system spends all its time moving processes in and out of memory and not enough time is spent doing useful work. For example, Process A needs its data in memory and the system has no space. So it clears out a page from Process B. Then Process B runs and it needs that page back again so the system moves out Process A's page.

Once thrashing occurs, the only solution is to limit the number of processes running so the remaining ones can get work done and free up the memory. The system picks a memory hogging process and simply swaps the whole process, not

Shared Executable versus Shared Library

In HP-UX, executable programs are, by default, shared. This means there is only one copy of the program, no matter how many users are executing it. For example, if ten people are running *vi*, then there is one copy of the *vi* text and 10 copies of the data. On the other hand, shared libraries are collections of common routines that are shared by multiple programs and the text for these routines is kept in a shared library on disk and loaded when one of the programs is loaded. So if both *vi* and *ls* use a common routine, then this routine is loaded in memory in a location separate from either of the programs. Thus individual programs take less space on disk and less space in memory.

just individual pages, out to disk. As long as thrashing continues, these processes are kicked out. Eventually, they gain enough priority to come back in and when they do, the system pages in only the one text page until more is needed. On the Series 800 Business Servers, the prime candidate for swapping is any process that has been asleep (waiting on a resource) for more than 20 seconds. Such processes are referred to as dead-heads. If no processes qualify, the eight processes using the most memory are selected as swap candidates. The process that has been around the longest is chosen from these.

The program swapper runs every second to check for thrashing. If there are too few pages free, it looks for a process to swap. Otherwise, it goes back to sleep until the next second.

Pseudo-Swap

On 800 Business Servers, the 9.0 kernel implements pseudo-swap. Prior to 9.0, there had to be disk space available for all processes to swap. But, in fact, the

system will never swap or page everything out as it only does the swapping to free up space for other processes. Therefore, the amount of physical memory available is included in the calculation of the amount of disk space reserved for swap and a 9.0 system will not encounter the problem of a system with 2 GB memory and 500 MB of swap still deciding it has no swap space when the size of programs exceeds the 500 MB disk space, as could happen at 8.0. Pseudo-swap can be turned off to limit the number of processes vying for kernel resources.

What About Those Messages?

Well, after all that, you should understand why those messages occur. There simply is no place to put all those programs on disk so other programs can run. The only solution (other than not running too many programs in the first place or buying more memory) is to provide more swap space on disk. The *HP-UX System Administration* and *HP-UX: Concepts and Tutorials* manuals both contain information on setting up disk swapping.

There are two types of swap—permanent (also called device swap) and file system swap. Permanent swap is space allocated on the disk at all times whether it is used or not. Excessive permanent swap is just wasted disk space. File system swap is space dynamically allocated from free blocks within the file system. File system space is accessed one disk block (usually 8 KBytes) at a time. Permanent swap is used 64 KBytes at a time so is faster and more efficient. While file system swap is slower, not all swap space can be used because the system needs to RESERVE the space but the process may terminate before ever using it. Determining how much is actually used, how often it is used, and how much is reserved at any time can be done with the various HP-UX analysis programs such as *Glance*, *LaserRX*, and *sar*. The system administrator can use these tools to tune the system for best performance and minimum unused disk space.

You can prioritize swapping on disks to share swapping equally among fast disks or delay its use on slower or heavily used ones. You can create permanent swap for general use and allocate file system swap so it is used only when the system gets really busy, such as when you run those end-of-month paycheck programs. Swap prioritization can be done with the *sam* program or

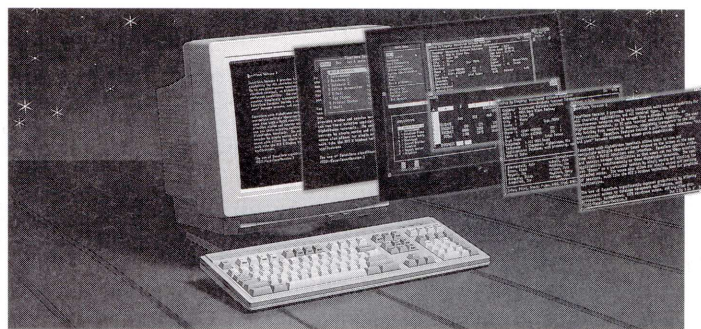
by changing the */etc/checklist* file (see *checklist(4)* in the manual pages).

Conclusion

While those error messages about memory and swap may look intimidating and foreboding, the system is simply saying it doesn't have enough room for programs it is trying to run.

Allocation versus Reservation

Prior to Revision 8.0 on the Series 800s, swap space was allocated for each process that was run. This meant that the system calculated the location on disk where each process would be paged. At 8.0 and 9.0, only the total amount of space is reserved as it is unlikely that most processes will ever use their space anyway and space is allocated only when needed.



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The solution is to give it more space or run fewer programs. You have to decide what kind of space to give it and where it is to come from. That kind of decision depends on your individual situation and the amount, location, and types of disks you have, as well as on how much data is stored on them. There is no single answer that is ideal in all circumstances. ■

John A. Pezzano is an HP Response Center Engineer in Atlanta, Georgia. Before moving to Atlanta, he spent seven years as an SE in the HP office in El Paso, Texas, supporting HP-UX systems.

Understanding Memory Dumps on HP 9000/800 Systems

The HP-UX operating system performs many different “sanity” checks in order to ensure that its internal structures are in a consistent state. In the rare event that the operating system determines that its data structure contents are logically inconsistent, the system may call its “panic” function and subsequently perform a “memory dump,” copying the contents of physical memory to one or more disk devices.

This article explores the circumstances under which a memory dump may prove useful and provides details of how a memory dump can be obtained on an HP 9000 Series 800 system. A review of the pertinent dump analysis tools will be included together with basic information concerning the interpretation of the data obtained.

System Failures

There are three distinct modes of system failure that can be encountered on a 9000 Series 800 system running the HP-UX operating system.

Kernel Panic

A kernel panic occurs when the HP-UX operating system detects an inconsistency within the data structures that it is accessing or if some “critical” operation cannot be performed (e.g., access to the “system” disk drive proves impossible). Continued operation is either impossible or inadvisable (because data integrity could be compromised). The kernel calls its “panic” function and displays a message on the system console in the following format:

```
interrupt type 15, pcsq.pcoq = 0.207630, isr.iior = 0.2ae6
Data page fault on interrupt stack
@(#)9245XA HP-UX (A.09.00) #0: Fri Oct 2 14:47:09 PDT 1992
panic: (display==0xbf00, flags==0x0) Interrupt
```

```
PC-Offset Stack Trace (read across, most recent is 1st):
 0x0029c9e4 0x0021879c 0x00204fc0
End Of Stack
```

```
NOT sync'ing disks (on the ICS) (0 buffers to flush):
0 buffers not flushed
0 buffers still dirty
dumping 50329600 bytes to dev0x7000002, offset 158560
```

COLIN KENNEDY AND MARK PAYNE



Illustration by Christine Benjamin

The system then halts and the contents of physical memory are copied to one or more disk devices.

The underlying cause of a system panic may be either a hardware or a software problem. This article will help you to make some educated guesses about the problem and also provide details of what information should be collected to enable an in-depth analysis.

High Priority Machine Check

A High Priority Machine Check (HPMC) is detected and reported by the CPU when it finds an abnormal hardware condition (e.g., a double bit parity error in main memory). The CPU stops the system, passing control to the kernel's panic function, which will in turn cause a memory dump to be created. HPMCs are almost always the result of a failure in system hardware.

Important parameters are displayed on the system console in the form of a "tombstone." This data should be recorded (though it can also be retrieved from the memory dump at a later time). Some 9000 Series 800 machines save HPMC information in non-volatile memory ("stable storage") and allow access to this data via system diagnostics.

System Hang

A "System Hang" is said to have occurred if the HP-UX operating system is still running but no user interaction with the system is possible. Users are unable to log on, log off, or obtain any response from their terminals. There may be no obvious messages on the system console.

System hangs have three main causes:

- a high priority program is looping and starving other processes of CPU time
- a program has locked a system critical resource and cannot run for some reason, effectively blocking all other processes from executing
- the system hardware has failed in some manner

If the system is truly hung (rather than temporarily locked or just very busy), then it is possible to force a memory dump to enable analysis of the problem. Most 9000 Series 800 machines have an "Access Port" which enables the user of the system console to interact with the system hardware and request such a dump. Issuing a "CTRL-B" command on the console will allow interaction with the access port, where a "tc" command

will perform a "Transfer of Control" (or "soft reset") thus forcing a memory dump to be written to disk.

Gathering Information When a System Failure Occurs

When a system failure does occur, it is possible to obtain various pieces of information that will assist in determining the cause of failure.

Recording System Status

After any memory dump is completed, the system will attempt to reboot HP-UX and useful information may be lost if it is not promptly noted. The following data should be recorded when any system failure is encountered:

- the Panic Message on the system console, together with any HPMC tombstone information
- the status of any system Light Emitting Diodes (LEDs) on the CPU box (Note that not all processor boxes have such LEDs.)
- the hexadecimal status LED or status bar on the system console (This will be of the form "Bx0x" for a kernel panic caused by software.)
- any "fault" or status lights on system disks or external peripherals

Saving a Memory Dump to Disk or Tape

Any kernel memory dump is written to appropriate location(s) on the system's disk device(s). It is not possible to use a file system for this purpose as file system corruption may well be the cause of the system failure itself. Thus HP-UX elects to save the memory image to one or more dedicated dump areas (which may optionally be the same areas that are utilized as system "swap" areas).

Dump areas are configured using the system generation file, typically */etc/conf/gen/S800*. Refer to Listing 1.

Here we see the "dumps on" definition which defines the memory dump location. In this case note that the dump areas will also be utilized for swap purposes. This is acceptable as no further swap activity will take place once the system panic has occurred.

As the system reboots, the *savecore* utility is run from */etc/rc*. This program copies the memory image from the dump area(s) into the file system. By default *savecore* will attempt to save memory dumps in the */tmp/syscore* directory. It is the system manager's responsibility to ensure that this directory exists

and that adequate disk space is available. If either of these conditions is not met, then the image will not be copied to the file system area (and the memory dump will be permanently overwritten if it resides on a disk area that is also utilized for swap purposes). See Listing 2.

Should the system have a large memory configuration yet have little file system space available, it is possible to copy the memory dump to a tape device instead of a file system. This can be achieved using `savecore`'s `-t` option—see `savecore(1m)` in the *HP-UX Reference Manual* for more detail.

Given the support for ever-increasing quantities of physical memory, it should be noted that the time taken for `savecore` to copy large memory images from the dump device(s) can be substantial. As this activity extends the system downtime, the use of dedicated dump devices becomes attractive. With such a configuration, `savecore` can run in the “background” whilst the system continues with the boot process and becomes available to the user community.

An alternative to creating “dedicated” dump devices is to use multiple joint swap/dump devices. As `savecore` finishes reading the data from each device, the device can be enabled as a swap device. Thus the amount of swap space available to the system is gradually increased as the dump is progressively saved. This mechanism works well in an environment where users gradually reconnect when the system is returned to service, but can cause problems where a high demand is placed on virtual memory soon after system startup.

Having now noted the messages that have appeared on the console (together with the output of status lights), and having successfully copied a memory image to the file system, exactly how do we interpret this information? How can we use the data that we have gathered in order to understand the reason for failure and minimize any further system downtime? The following sections will offer some advice.

Console Messages

Trap Panic Messages

A common reason for a system panic is when low-level trap handling code cannot resolve the cause of a trap that occurs when kernel code is being executed. The most commonly observed traps are Data Segmentation, Instruction Segmentation, and Protection Faults.

Data Segmentation Faults. This trap panic can occur when the kernel attempts to de-reference a null pointer. A data

LISTING 1 System Generation File (extract)

```
console on cio_ca0.mux0 at 8.1;
dumps on cio_ca0.hpfl0.disc2 at 8.0.1 section 7
        cio_ca0.hpfl0.disc2 at 8.0.1 section 11
        cio_ca0.hpfl0.disc2 at 8.0.2 section 11;
root on cio_ca0.hpfl0.disc2 at 8.0.0 section 13;
swap on cio_ca0.hpfl0.disc2 at 8.0.1 section 7
        cio_ca0.hpfl0.disc2 at 8.0.1 section 11
        cio_ca0.hpfl0.disc2 at 8.0.2 section 11;
```

LISTING 2 “save_core” function from “/etc/rc”

```
save_core()
{
    if [ -x /etc/savecore ] && [ -d /tmp/syscore ]
    then
        /etc/savecore /tmp/syscore
    fi
}
```

segmentation fault is architected as trap number 15, so a message of the following form will be observed:

```
trap 15 pcsp.pcoq = 0.0xfd0000 isr.ior = 0.4
```

Instruction Segmentation Faults. This trap panic is nearly always caused by a branch to a page that isn't mapped. Remember that the kernel is not paged so that a process executing in the kernel shared text segment should not page fault. This is trap number 6 so you would expect to see a message thus:

```
trap 6 pcsp.pcoq = 0.0 isr.ior = 4.0x78
```

Protection Faults. Protection faults have two causes: incorrect access rights to an accessed page or misaligned loads or stores. An HP-PA machine has four protection id's stored in registers on the processor and a process can only access pages with those protection id's. This trap is number 18 and the resultant message produced would be of the form:

```
trap 18 pcsp.pcoq = 3.0x10 isr.ior = 4.0x73
```


FIGURE 1

Example 9000 Series 800 HPMC Tombstone

***** UNEXPECTED HPMC ON PROCESSOR# 0 *****

GENERAL REGISTERS:

```

r00/07 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
r08/15 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
r16/23 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
r24/34 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx

```

CONTROL REGISTERS:

```

sr0/7 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
poq xxxxxxxx.xxxxxxxx xxxxxxxx.xxxxxxxx isr = xxxxxxxx ior = xxxxxxxx
pid1/4 xxxx xxxx xxxx ipsw = xxxxxxxx iva = xxxxxxxx sar = xx ccr = 00
tr0/7 xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
rctr = xxxxxxxx itmr = xxxxxxxx eiem = xxxxxxxx eirr = xxxxxxxx iir = xxxxxxxx

```

MACHINE CHECK PARAMETERS:

```

Check Type = xxxxxxxx CPU STATE xxxxxxxx Cache Check = xxxxxxxx
TLB Check xxxxxxxx Bus Check = xxxxxxxx PIM State = x SIU Status = xxxxxxxx
CCU0 Diag0,x xxxxxxxx xxxxxxxx CCU Log: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
CCU1 Diag0,x xxxxxxxx xxxxxxxx CCU Flags: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
MCX State: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
MCY State: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
BCX State: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
BCY State: xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx

```

Here the instruction that caused the trap is a 3.0x10 and the address of the memory reference is 4.0x73.

Other Panic Messages

There are many different types of system panic that are initiated from the kernel itself rather than from low-level trap functions. Space limitations dictate that a full catalogue is not possible here, but a brief selection of kernel initiated panics follows.

File System Panics. Should the kernel detect certain inconsistencies in the HP-UX file system, it may well result in a panic situation. This class of failure includes the following specific situations:

- panic: freeing free frags
- panic: freeing free inode
- panic: Hard I/O error in swap
- panic: ifree: freeing free inode
- panic: cannot seek to block nnn

In general, use of the `fck(1M)` utility is recommended as the first action in order to attempt to resolve any logical file system corruption. Should the problem be with the physical disk drive, a hardware resolution will be required.

Miscellaneous Panics. Kernel coding defects are one underlying class of system panic types. The following panic was occasionally observed on previous releases of HP-UX where OTS/9000 was being run over X.25.

```

panic: (display==0xbf00, flags==0x0)
m_free: freeing free mbuf

```

This problem was subsequently resolved by a software patch.

The kernel can also become confused when the system manager incorrectly updates key system configuration files. The following panic can be generated if the `/etc/init` file is corrupted:

```
panic: init died returning error 255
```

Decoding HPMCs

In the event of an HPMC, most systems will write a “tombstone” to the system console. The structure of this information is machine specific, but there is some degree of commonality

between the output on different systems.

We have already said that an HPMC is detected by the system hardware and is in general caused by a hardware failure of some kind. The most important field from the HPMC tombstone is known as the “Check Type.” This parameter enables us to isolate the fault to the CPU board or a memory or I/O subsystem component.

On all 9000 Series 800 systems the Check Type can be decoded as follows:

Check Type

4000000x	TLB Check
8000000x	Cache Check
20000000	Bus Check

TLB (Translation Lookaside Buffer) and cache checks indicate that a hardware problem has been detected on the CPU board itself. A bus check, however, is indicative of a problem communicating with the memory or I/O subsystems. In this case, other HPMC parameters will aid in determining the cause of failure, but space requirements preclude any further discussion here.

Figure 1 shows the layout of a 9000/850 platform

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FIGURE 2 9000/8X7 Stable Storage HPMC Information

Console> pim

Processor State Information (HPMC)

(contents of registers)

IIA Space = 0x0000000a

IIA Offset = 0xf00055f0

Check Type 0x20000000

Cache Check = 0x00000000

TLB Check = 0x00000000

Bus Check = 0x00210000

Assists Check = 0x00000000

Assists State = 0x00000000

System Responder Address = 0x00000008

System Requestor Address = 0x00000000

Path Info = 0x00000000

Viper Status Register = 0x00000160

Boa Status Register = 0x08002521

HPMC Error Logs Information

HPMC type = 7000

slot 0B: Processor Dependant

Memory Estat= 0x19

(850/855/860/870) HPMC. The Check Type is the first of the "MACHINE CHECK PARAMETERS".

The "Nova" family of machines (9000/8X7) hold the HPMC information in an area called Stable Storage (non-volatile memory). To access this information, interrupt the system boot process and reply "n" to the boot path commands. At the Processor Dependent Code (PDC) prompt use the "pim" command to display the data. Figure 2 shows a bus check caused by a double bit memory error on the memory card in slot 0B. (Estat value 0x19 signifies that an uncorrectable RAM error occurred in a memory module).

Hex Status

All 9000 Series 800 systems make use of a 4-digit hexadecimal mnemonic in order to report self test and runtime status information. The hex code may be seen on the front of the 9000/8X2 and 9000/850, 855, 860, 865, 870 system cabinets. Other Series 800 systems that have Access Port (AP) functionality may access the hex code by activating the AP status bar on the system console by typing CTRL-B. Normal console operation can be resumed by using the "co" command.

The hex status after an HPMC or Kernel Panic will be "BX2X" for an HPMC or "BX0X" for a kernel panic.

Analyzing Core Dumps

There are several system tools available that are of use when seeking to analyze a memory dump.

The absolute debugger (adb) utility is a general-purpose debugging program that can be used to view (and optionally modify) locations in a memory image or "core" file. It uses the symbol table contained within the object file and

allows these symbols to be used when accessing the values held within the core file. It should be noted that adb is not the most friendly of utilities and does not even respond with a "prompt" when invoked. Also, adb "traps" signals and will not therefore respond to a "quit" signal. Use "\$q" or CTRL-D to exit from adb. See the adb(1) manual page for more usage details.

"analyze" is a core dump analyzer that can deduce the state of the HP-UX operating system at the time of the system crash. It can be used to determine the state of all processes in the system. It also attempts to identify inconsistencies in the usage of system resources, and can report on the status of subsystems such as virtual memory, I/O, and networking. Analyze can be used in either batch or interactive mode. Interactive mode is entered if no options are specified. The analyze utility currently has no fewer than 20 options that can be given at invocation. There are nearly 30 commands available when running it in interactive mode. It is a daunting and complicated tool, though the reference manual page does provide some useful assistance.

Because of space restrictions, analyze is not shipped as part of the update media, but it is included on the HP Support media.

"scancore" is a "stripped down" version of analyze that provides the most commonly used functionality of analyze but occupies much less disk space. Scancore has been shipped with all 9000 Series 800 systems since Release 9.0 of HP-UX.

Given the complexity of the above tools and the fact that initial usage is generally consistent, the more "friendly" script "quicklook" ("ql") is now included with HP-UX shipments. When invoked



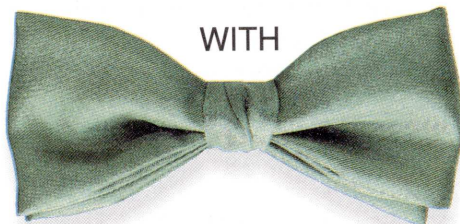
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FIGURE 3 Using *adb* to retrieve the system message Buffer

```

$ cd /tmp/syscore
$ adb -k ./hp-ux.0 ./hp-core.0
msgbuf+8/s

trap type 15, pcsq.pcoq = 0.14b2e8, isr.iior = 0.0
a(9245XA HP-UX () #1: Mon Mar 18 14:09:46 PST 1991
panic: (display==0xb000, flags==0x0) Data segmentation fault

PC-Offset Stack Trace (read across, most recent is 1st):
0x000fe364 0x000b20c8 0x000a5374 0x0014b2e8 0x0014b3f0 0x000ed6b0
0x000f62d8 0x000b32f8 0x000a5774
End Of Stack

sync'ing disks (0 buffers to flush): (0 buffers to flush):
0 buffers not flushed
0 buffers still dirty

dumping 50331648 bytes to dev 0xa00010f, offset 0 ...

```

FIGURE 4 Executing “analyze” to check for an HPMC

```

$ /usr/contrib/bin/analyze -A hp-core.0 hp-ux.0 >/tmp/analyze.out

REGION BASED VERSION

HP-UX Analyze version: [9245XA HP-UX () #1: Fri Mar 15 14:38:14 PST 1991]

Reading symbol table... done
Scanning symbols.... done
Scanning I/O.... done
Reading in tables... done

$ cat /tmp/analyze.out

*****
*                               *
*   Crash Processor Table       *
*                               *
* *****

CPT Table Index 0:
Processor Slot Number = 0
Processor HPA = 0xffff80000 PDC Vector = 0x00000880 IVA = 0x00137000
HPMC RPB Address = 0x0019f850 TOC RPB Address = 0x0019f9d0
HPMC Count = 0x00000000 TOC count = 0x00000001
mpinfo table index = 0x00000000 State Saved = 0x00000001 (YES)

```

without arguments, *ql* provides a menu-driven interface that allows fundamental information to be extracted from the memory dump and optionally saved to a log file.

It should be noted that *analyze*, *scan-core*, and *ql* are tools that are not officially supported by Hewlett-Packard.

Performing an Analysis

The easy way to gather key pieces of information is to use the *ql* utility. Unfortunately this will not always provide all of the information necessary to understand why any given system failure has occurred. Thus this section will provide usage details for the base analysis tools.

Check the system message buffer.

HP-UX writes panic messages as well as other critical, system-level information into an area called the “system message buffer.” This 2-KB “round-robin” buffer is the first place you should look when attempting to analyze why a panic has occurred. The buffer can be viewed using *adb*. (See Figure 3.)

After invoking *adb*, type the command *msgbuf+8/s*. This asks *adb* to print a string starting 32 bytes (8 x 4 bytes) past the symbol “*msgbuf*”. The system message buffer should then be printed. *adb* knows that strings in HP-UX are terminated with a NULL character, so output is terminated when the end of the message buffer is reached.

Check the buffer for panic messages, or other messages that might be interesting (e.g., I/O devices that were not responding). If a panic occurs, then note the message. If a trap occurs, then note the trap type and the contents of the queues and interrupt parameter registers (*iir*, *isr*, and *iior*). If no messages appear, then an HPMC probably

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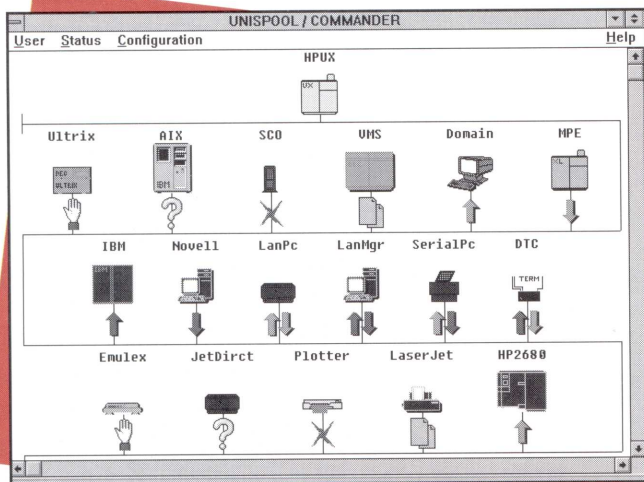
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FIGURE 5 *Process Table entry for currently running process*

```

proc[21] pid 224 ppid 211 pflag 0x00060001 pstat 0x03 wchan 0x00000000
p_link 0x0037d88c p_rlink 0x00000000 p_usrpri 0x000000b2 p_pri 0x000000b2

MP Flags: SRUNPROC
Flags: SLOAD SSIGABL SPRIV S2EXEC
Current state SRUN
Command: PSMON PSMON;PSMON;0;0;
u. loaded:
uvaddr :0x7ffe6000 U_COMM PSMON
p_cdir: 0x00777da8 p_rdir: 0x00000000 u_ap: 0x7ffe6274

```

occurred, or the system was halted via a transfer of control.

Did an HPMC occur? The analyze utility may be used to determine whether the system failure was caused by an HPMC. (This is obviously useful if no console error messages were captured at the time of the system interrupt.) Invoke analyze with the “-A” option in order to report hardware register contents. Given the volume of the output, it is general practice to redirect standard output to a file and use an editor to interrogate the file. Refer to Figure 4.

Here the HPMC count can be seen to be zero, whilst the Transfer of Control (TOC) count is set to one. Thus rather than a high-priority machine check being the cause of the failure, a TOC caused a memory dump to be produced.

Look for the string “Check type word” in the analyze output. This will point you towards the HPMC information discussed above.

What was the current process? Edit the output from the analyze utility and perform a “string search” for either “CURRENT PROCESS” or “SRUNPROC” in order to identify which actual process was running when the system failed. This string search will leave you looking at an entry in the system process (“proc”) table, which has one record for each currently running process on the system. Note that there may be more than one SRUNPROC flag if the system has more than one processor.

When the current proc table entry has been identified, look below the current line for the field “U_COMM” or “Command”. This field will contain the name of the currently running process. (See Figure 5.)

If a system is failing regularly with a panic or a system hang, then the current process is of particular interest. If, for example, it is a user process that is performing Link Level Addressing, it would seem advisable to explore the program’s coding.

Which routine caused the panic? Look a few lines down from the U_COMM entry and you should see a kernel stack trace similar to the one shown in Figure 6.

Here you can see the route of execution that was taken through the kernel from the time that a system call was made until the system finally called its panic function. The fact that

FIGURE 6 *Example Kernel Stack Trace from Analyze*

```

Kernel Stack trace:
    starting sp=0x68fa8fb8
panic+0x1c ( arguments not stored )
    pc=0x154118, pfmp=0x68fa8f58, psp=0x68fa8f78
io_get_timer+0xac ( arguments not stored )
    pc=0xd9f1c, pfmp=0x68fa8ef8, psp=0x68fa8f18
mbpsix25_read+0x6bc ( arguments not stored )
    pc=0x7f0a8, pfmp=0x68fa8e48, psp=0x68fa8e68
pdn0_read+0x4ac ( arguments not stored )
    pc=0x6b3dc, pfmp=0x68fa8cc8, psp=0x68fa8ce8
rwip+0x1ec ( arguments not stored )
    pc=0x96e8c, pfmp=0x68fa8b70, psp=0x68fa8b90
ufs_rdw+0x160 ( arguments not stored )
    pc=0x96bc4, pfmp=0x68fa8af0, psp=0x68fa8b10
vno_rw+0x114 ( arguments not stored )
    pc=0x1646e4, pfmp=0x68fa8a40, psp=0x68fa8a60
rwuio+0x158 ( arguments not stored )
    pc=0x1570ec, pfmp=0x68fa89f8, psp=0x68fa8a18
read+0x50 ( arguments not stored )
    pc=0x156dc8, pfmp=0x68fa89a8, psp=0x68fa89c8
syscall+0x230 ( arguments not stored )
    pc=0xc66b0, pfmp=0x68fa8948, psp=0x68fa8968
$syscallrtn+0x0 ( arguments not stored )
    pc=0xb70f4, pfmp=0xffffffe0, psp=0x0

```


the kernel was performing I/O activity and then called "X25" related functions before the system panic is of interest. It is not at all clear however that the "io_get_timer" function (that was being executed before the system panic occurred) is the errant function. It is more likely that this function is the victim of a different area of code having trashed a data structure that it is now accessing.

In the final analysis it may require a detailed knowledge of the internals of the HP-UX operating system in order to make sense of the array of functions and system tables and highlight the cause of failure. Naturally the source code of the operating system may well be required, thus precluding most parties' attempts to analyze their failures fully.

Conclusion

We have now explored the different types of system failure and considered what information can be captured and how best this data can be analyzed. In some cases enough information will have been gleaned to draw firm conclusions as to why system operation was interrupted. In other cases the reason for failure will be far from clear. In either case it will generally be worthwhile for ResponseLine customers to contact their local Hewlett-Packard Response Center in order to discuss their findings and request additional analysis. ■

Colin Kennedy has spent the last six years supporting HP-UX in HP's UK Response Center near London. His current focus is the support of "mission critical" customers in the banking and telecommunications sectors.

Mark Payne also has worked in the UK Response Center for the last six years. He supports HP-UX and MPE XL systems and provides specialist support to HP's field engineers.



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High-Speed Modems and uugetty

ONE OF THE FIRST HP-UX Systems Administration columns I wrote was about uucp. This was back at the end of 1991 and was an overview of what uucp is and how it is configured. Back then I was using some slow 2400 baud modems and not using the uucp functionality to its fullest.

In November of 1993 the company I work for moved to new headquarters. One of my tasks, besides safely moving all the hardware, was to install at least three high-speed modems to our 827. Previously we were using a data switch that supported calling back users who dialed in through the modem. Unfortunately, this prevented us from transferring files remotely because the data switch did not easily support RTS/CTS flow control.

In the new office, we have two dedicated data lines that are connected to two Multitech 9600 baud modems, one Multitech 9600 baud modem on a voice/data line, and a 2400 baud modem on another voice/data line. The 2400 baud will soon be replaced with a 14400 baud Multitech Fax/Modem when I get the time to switch my uucp news and e-mail feed from our 835 to our 827. The installation of the Fax/Modem will be a future column.

Naturally we wanted to use all the high-speed modems as incoming and outgoing lines. Unfortunately the standard getty supplied with HP-UX does not support this. Instead I used the uugetty(1M) program. uugetty allows a modem to be used for both dial-in and dial-out without changing any configurations. kerm(1) also works with uugetty.

uugetty is configured the same way as a normal getty is. In fact, if you edit the */etc/inittab* file and change the getty entries on the lines that you are using


for modems to uugetty, you will be able to dial in and out immediately. Naturally after editing the */etc/inittab* you should execute 'init q' to tell init to update the running processes. You may also have to kill the existing getty's on the modem ports. Sometimes I had to do this, sometimes I didn't.

The options to uugetty and getty are identical except for the -r option to uugetty. This option, poorly documented by HP and others, causes uugetty to wait to read a character for displaying the login prompt, and is necessary to use kerm with uugetty. I was unable to find any reference to this in the man page for kerm or uugetty, but an engineer at the Response Center told me to use this. Since using the -r option on my uugetty's I have not had any problems with kerm being interrupted.

There is one caveat with using the -r option to uugetty. If uugetty is being used on the remote line, you may need to send multiple carriage returns in your login script before the remote will supply a login prompt.

As I mentioned in the last column, I suggest contacting the HP Response Center and asking for their assistance in setting up high-speed modems and uucp. There are several issues that they can help resolve long before you encounter them. The one that got me was incorrect permissions on the uucp files, which prevented a normal user from running uucp. A call to the Response Center resulted in a fax with the correct permissions and solved my problem.

After setting up uugetty I strongly recommend that you add dialup passwords to your system. They are easy to implement and add an additional layer of protection to your system. Pick a password that is easy for your users to remember,



WHAT'S

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then butcher it. Have them spell it backwards, replace the i's with l's and the o's with 0's. You want a password that is easy to remember but hard to crack.

I would also recommend using the `lastb(1M)` command to detect failed attempts to log in; check to see if users' passwords might have been compromised. (Look for the login name followed by a couple of characters. If the user is in a hurry and types too fast, the password might appear as part of the user name.) Running this once a day will detect invasion attempts quickly.

Tip of the Month

Use `kermit` to check and change your modem parameters. Run `kermit -i`, set the port and the speed, then connect to the modem. You are now directly connected to the modem and can use the ATL commands to view the current settings. The ATL commands are for Hayes-compatible modems; refer to your modem's documentation for the options supported. This is a lot easier than disconnecting the modem and attaching it to a terminal!

Patches from HP

In the past I have praised the `hpux-patch` mailing list as a great source for obtaining information about patches that HP has made to HP-UX. I guess that someone at HP noticed this list and the number of subscribers to it because they have started their own.

In early December a message was posted to the `hpux-patch` list introducing the "HP SupportLine Mail service." The service consists of 11 mailing lists. According to the message the service is available to anyone who has Internet e-mail access. If you use CompuServe or something similar and can send and

receive e-mail, you can also use the service. You do not need an HP Support Contract.

The first step in using the service is to obtain the user's guide. Send some e-mail to `support@support.mayfield.hp.com` with the following as the text of the message:

```
send guide
-or-
send guide.txt
```

The first command sends the guide in `nroff` format. The second sends it as ASCII. The mail service will then send you the guide. I sent for mine as I was writing this, so I'll let you know what is in it next time.

The mailing lists available as of December 1993 are:

<code>hpux_all_patch</code>	weekly digest of all new <i>HP-UX</i> patches
<code>hpux_300_patch</code>	weekly digest of all new <i>HP-UX</i> 300/400 patches
<code>hpux_700_patch</code>	weekly digest of all new <i>HP-UX</i> 700 patches
<code>hpux_800_patch</code>	weekly digest of all new <i>HP-UX</i> 800 patches
<code>dom_all_patch</code>	weekly digest of all new domain patches
<code>dom_m68k_patch</code>	weekly digest of all new domain m68k patches
<code>dom_a88k_patch</code>	weekly digest of all new domain a88k patches
<code>technical_tips</code>	weekly digest of new HP Technical Tips
<code>existing_news</code>	monthly digest of new Existing Product News
<code>general_news</code>	monthly digest of new HP General News
<code>new_products</code>	monthly digest of new HP Product Information

The names and descriptions were taken directly from the posting to the `hpux-patches` mailing list.

You can subscribe to one or more mailing lists by sending e-mail to `support@support.mayfield.hp.com` with the message

```
subscribe <name of mailing list>
```

The `<name of the mailing list>` is replaced with the list as described above, e.g.,

```
subscribe technical_tips.
```

The last four were the biggest surprise to me. I am subscribing to all four and recommending that my boss subscribe to the last three. I hope these lists will provide up-to-date information about HP products that we usually wait several months to hear about.

Without having the user's guide I do not know if you can obtain a list of all patches available and all the technical tips. Note that the lists are for new patches only. I also suspect that there are ways of obtaining the patches through e-mail; I am investigating and will let you know what I learn.

If you have questions, comments or problems with the service, send e-mail to

HP-UX Swap Tape

It's not too late to purchase your Swap Tape for the HP-UX platform. The San Francisco Conference Swap Tape is still available for:

CSL/Site-level members	\$150
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Non-members	\$695*

* price includes a full CSL/Site-level membership

MPE and RTE Swap Tapes are also available at the same rates. For more information on the Swap Tape, call the Member Services Department at (800) INTEREX.

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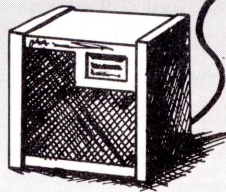
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I am going to step up on my soapbox for a minute here:

I am really glad that HP has taken this step to get information to the users of their products. I know that one of the reasons they could not do this earlier was because the Internet was not available for commercial use.

I would really like to see this service available to everyone. I think that HP should ask customers if they have e-mail access when they renew or start a support contract and if they do, ask them if they want to join one of the mailing lists. This way the customer does not have to read this magazine or comp.sys.hp.* or any other contact to find out about this service.

They could also include an option on the support contract to receive this information monthly or quarterly via paper mail. (I understand that this would cost more, but I would gladly pay a small additional amount to know what problems HP has detected and fixed.)

One last thing before I get off my soapbox: I am extremely happy that HP is providing this service; while the hpux-patch list provides an excellent service, it requires that the users of the patches post the descriptions of the patches that HP has provided

them. This new service will inform us of any patch HP produces.

I have heard that the mailing list might be a trial program, so if you use it I recommend that you tell your sales reps and anyone else at HP if you have a chance.

And I step off my soapbox.

That's all for this month. I hope you continue to send me your comments and suggestions for future columns. ■

Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: chris@bwilab3.atl.ga.us

by Larry Headlund

New from COSE

AS I WRITE THIS, I am just back from the Common Desktop Environment (CDE) Developers' Conference, which presented the first fruits of the Common Open Software Environment or COSE initiative. COSE is the result of NT putting the fear of God, or at least the fear of Bill Gates, into the UNIX vendors IBM, Novell, SCO, Sun, and HP. The goal is to end the UNIX wars and enable UNIX to present a common face to the user and to the developer. Perhaps the best indication of how serious the vendors are about this is Sun's change from OpenLook to Motif.

The GUI is obviously an important part of a common face, but not the only part. The CDE is subtitled "A Technology of the Common Open Software Environment," implying other pieces to come. The CDE itself includes a common API specification for UNIX with a mind-numbing 928 system APIs, 77 headers, and 174 commands covering terminal communications and I/O, file system and memory functions, math, TCP/IP and sockets, signals, and other core O/S functions. Here I am going to concentrate on the GUI parts, with side trips to other portions that particularly interested me.

Attendees of the CDE Conference got a CD-ROM with the 10/29 snapshot of the work in progress. This assured everyone that this was a real project with real accomplishments, not just a public relations exercise. Not all the technology scheduled for early 1994 release was available for all platforms, but enough was there to excite the standing-room-only crowds. At least, I was excited.

Let's look at what the CDE is.

Common Desktop Environment

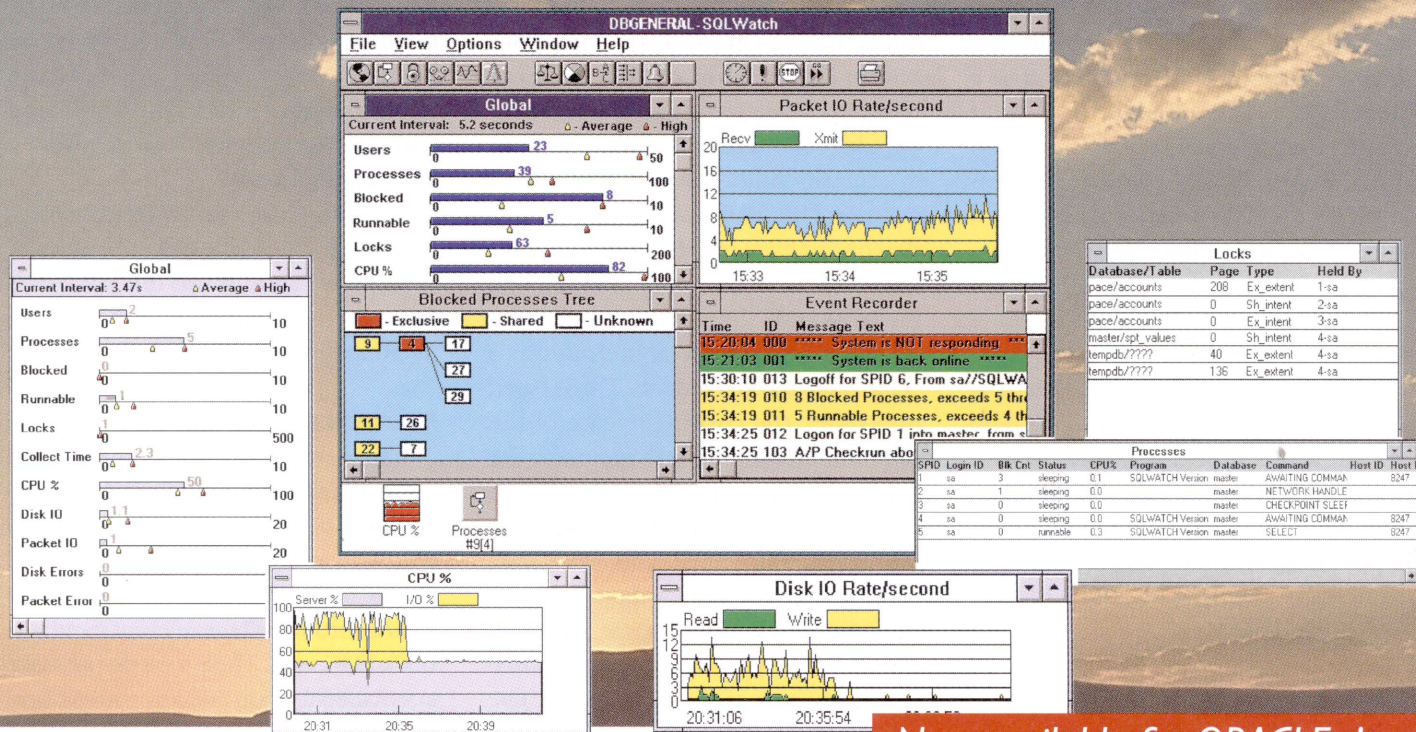
At the top level, the user interface looks like HP VUE. The distinctive front

panel is there; so are the rooms and the pretty background. One difference is that it seems every one of the applications on the front panel has an up arrow for additional choices just as the Help, Print, and ToolBox do now. The whole environment is based on HP VUE so there won't be much culture shock (and training) for existing users of HP VUE. At first glance, the biggest difference is that the default environment on other systems has four rooms instead of six.

There are a lot of new applications on that desktop. The text editor is the same as HP's VuePad, but this will now be standard across platforms. There is a standard calculator, an Icon Editor, and the File Manager is from HP VUE also. There are some nice goodies from other vendors also.

From the Solaris DeskSet comes a mail tool and calendar. Beyond being useful tools, they are offered as examples of collaborative applications, the kind we all should be writing. The mail tool is a world better than the MH interface bundled with HP VUE now. It is a real Motif application with buttons, pull-down menus, and scroll bars. It can handle multimedia mail using the MIME standard and stores its data in the standard Bento format. There is a ToolTalk (also from Sun) interface so that applications can have mail awareness embedded in them. The Bento format shows how non-parochial the COSE vendors are, since this technology is from Apple. The calendar offers real advantages over the datebook application shipped with HP-UX. It includes the ability to schedule group appointments, as well as a user interface with a lot more bells and whistles than datebook. There is an RPC (Remote Procedure Call) daemon to coordinate all calendars on the host.

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It is true that even with all the GUI applications available after years of GUI development, probably the most common program running on X terminals is a terminal emulator. Here CDE offers a new DEC VT220 emulator with Motif (CDE) look and feel built around a terminal widget. Being based around a terminal widget means there is now a standard way to embed terminal functionality in a program. The CDE terminal emulator is said to be compatible with the X11R5 xterm.

A help system based on HP's is offered across all platforms. This help system offers hypertext access to configuring help applications. Full documentation of the supporting language is provided, which allows the developer to include graphics and possibly live action inside of help.

Development Tools

Since this was a developer's conference, there was a lot of emphasis on development tools. This is crucial to the success of COSE. If independent developers do not support it, COSE will be another ACE. To avoid this fate they have agreed on some RPC and communication tools and a new shell scripting language, produced some new widgets, and offered an interface builder.

The major inter-client interface tool is ToolTalk from Sun. This will integrate with HP's SoftBench. ToolTalk allows aware applications to respond to and transmit messages to other aware applications. This should allow both reuse of existing applications and the possibility of extensive end-user or system integrator customization. On a lower level, they have agreed to disagree. Both ONC (originally from Sun) and OSF DCE will be supported on all platforms. There is

a unified socket API based on the 4.3 BSD Reno variant.

On the level of tools used by developers, CDE included a visual interface builder for designing applications. It features a tool palette for selecting and placing widgets and the other features of an interactive builder. It will generate C, C++, or UIL code. This builder was demonstrated at the conference but was completed too late to be included on the CD-ROM.

Another major tool included is a "new" shell called the dtksh. This is based on ksh-93, the current release of the Korn shell. If you haven't moved to the Korn shell yet, get hip! The dtksh includes features of the wksh or Windowing Korn Shell. This allows shell scripts to manipulate widgets directly, including having shell script functions as callbacks. This is one of the most interesting features of the CDE to me. The dtksh is extensible (you can dynamically link your own libraries into the shell, embeddable (as a very large embedded language), and has its own nifty features such as built-in math libraries. When this shell was only available for USL/Novell machines, I suffered serious tool envy. With all its features this is a serious rival to Perl and TCL.

New Widgets

The terminal widget, which is the core of the terminal emulator, answers a long felt need. In fact, several columns ago I included some public implementations of terminal widgets as favorite tools. Having a standard widget should help everyone.

There is now a ComboBox widget. The ComboBox is familiar to users of MS Windows and allows for easy selection from a list of items. This new widget

will kill off the handmade versions, including my own. A SpinButton widget, which is used to increment/decrement an arbitrary TextField, has been added as well. Similar widgets will be available with Motif 2.0 and OSF and CDE are working together to ensure a smooth migration.

The help system mentioned earlier is available in widget form. Thus every application should use the same rich help system as the OS. This should end needing help with the help.

Internationalization

There was a significant emphasis, as well there should be, on the internationalization of applications. The internationalization effort is built on Motif's I18N efforts. Multibyte character sets are supported through all the relevant standards (ISO, EUC, etc.). These tools do not make internationalization painless; you still have to code in an I18N aware manner (don't use XmSTRING_DEFAULT_CHARSET for example), but they do make it possible to program for I18N in a portable manner. It should be mentioned that I18N is still a controversial field with many competing standards.

You can print from X!

That was the title of one of the most popular sessions of the CDE Conference. What it means is that a mechanism has been provided, with a couple of function calls, to use the same X (and Motif) functions used to draw on the screen to produce printed output. Both Postscript and PCL printers are supported. A common language for Postscript and PCL is nice enough, making that language the same as X is wonderful. This should reduce the million-dollar user interface, dime store printout syndrome.

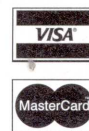
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Flies in the Ointment

Standardization and vendor cooperation are like apple pie and motherhood these days. What could there be to criticize in this effort? Besides being late in the day.

The good is the enemy of the better, or how do you compete with freeware.

One of the reasons MS-DOS has tons of editors and word processors while historically UNIX had few was that UNIX shipped with a serviceable editor (vi) and had a free editor (emacs) with amazing power. Because the line editor shipped with MS-DOS was so primitive, everyone had to get something better, which created a market, which created suppliers and an industry. The same with compilers. If MS-DOS had shipped with a poor but

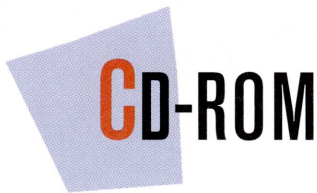
default Pascal or C compiler, do you think there would be a Borland today? The same is true of communication tools (cu, uucp) and networking. This isn't to say that the bundled tools are bad, just that the entry-level competitor faces real competition. Just as every third-party compiler has to be significantly, nay very, superior in some respect to gcc from the FSF, mail tools, desktop calendar, and interface designers have now got to face the question not only of which, but of why buy this product. There were third-party print tools and help systems available also.

Another question is source code availability and compatibility. CDE is based on Motif 1.2, not the upcoming Motif 2.0. I hope this will not start another GUI war. The CDE is adding some new

widgets. Will these be available on OSF type terms or bundled with OSF Motif. One of my businesses depends absolutely on source code availability. I am not alone in this.

On the whole I am excited about CDE and COSE and wish it more than well. These are great tools and great ideas. I really wish they had done this two or three years ago. ■

Larry Headlund is president of Eikon Systems and has been working with commercial UNIX since 1982, with HP-UX since 1984, and with X since 1988. He can be reached at (617) 482-3345 or lmh@world.std.com.



Multi-platform CD's

by Bill Hassell

COMPTON'S NEW MEDIA, PUBLISHER of Berenstain Bears and Compton's Interactive, has refined its Multiple Operating System Technology (M.O.S.T.) to allow Macintosh computers to use a single disc that is also compatible with DOS, Windows, and Sony multimedia platforms. This represents a great marketing bonus in that only one title is needed for all of the platforms, thus reducing store inventory and making the CD available to many different users.

Interesting Titles

There are thousands of CD-ROM titles to choose from today, and many are quite inexpensive, especially compared to the cost of the same information in paper, not to mention the audio and video data also available on many discs.

Here are a few unique discs:

Star Trek (trekkie alert), both the original and now the second generation have their own discs, complete with multimedia sound and video, each about \$50. Also in the same area is the *Interactive Space Encyclopedia* and the *Lawnmower Man* (a virtual reality adventure), again from the Multimedia Publishing Studio. For more information, call the toll free number at (800) 898-VTGA.

Here is a real curiosity: *Karaoke Macbeth*. Now for the uninitiated, Karaoke is a Japanese term meaning "empty orchestra," but it really means music without the lead singer's voice and, often, with the words on a TV screen. Karaoke uses either LaserDiscs on which the video is full-motion and the words are superimposed over the picture, or CD+G, the audio CD extension that allows forward- and backward-compatible music with graphics located in the subcodes on the disc.

If this title does what I think it does, I suspect that budding thespians will now

appear in little theater groups with a TV prompter, quoting Macbeth like seasoned performers.

7th Guest: This gets rave reviews as being one of the best game discs around. Be aware that it is a computer-killer in that a 486/33 machine with 4 megs of RAM is at the very low end of acceptable performance for this free-time diversion. The software even rates your computer before you start. An ideal combination is a double-speed drive (or now, triple speed) and a 486/50, or any Pentium-based CPU. The program is too big for one CD; it takes two!

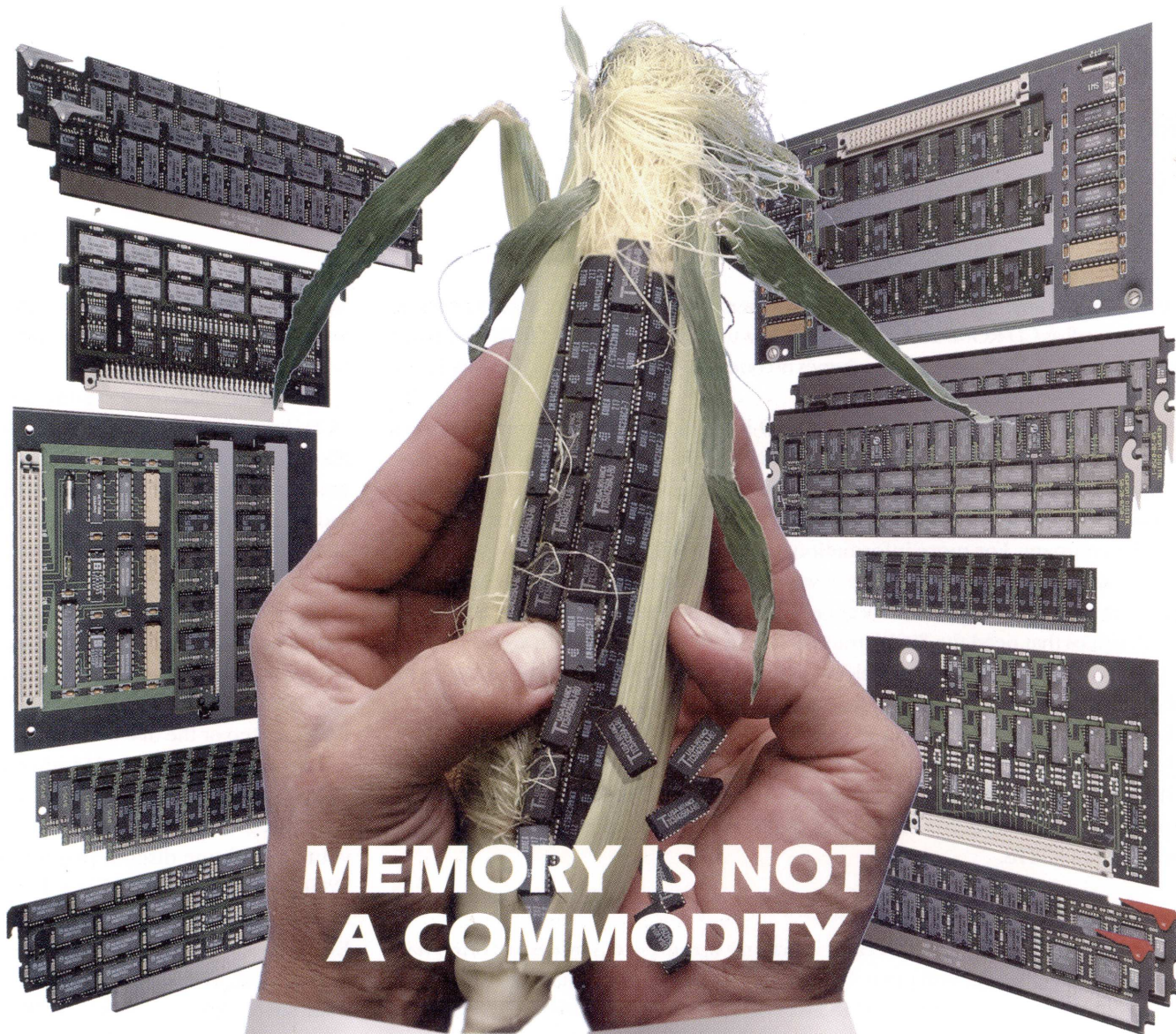
Iron Helix is also getting good reviews, with lots of folks asking for hints on how to play into higher levels.

CD-Blaster is a great collection of tools (and toys) for Windows 3.1. There are thousands of sound effects, several hundred MIDI music files and talking icons, and even a video library of both photos and video. This is a bargain at \$39 from Aristo-Soft (800) 338-2629.

Picture Atlas brings the high-quality images of the *National Geographic* magazine to the PC user. Little icons signify movies, pictures, and narration, and with a few clicks on keywords in the text, the world is brought to life for the desktop user. From the National Geographic Society, (800) 368-2728, about \$150.

Corel has released more than 100 CDs in a series called *Corel Professional Photos*. Each CD holds 100 PhotoCD images ready for publishing without additional royalty fees. Included with each disc are utilities such as a screen-saver, CD-Audio, a visual file manager, and PhotoCD Lab. Photographers who want to have their works published should contact Corel's publishing department at (613) 728-8200 ext 5080.

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series of study guides to literary works and is now extended to the electronics age with floppies as well as CD-ROM. Each volume requires up to 20 megabytes of hard disk space; the version on CD-ROM stores four volumes on one CD. Alas, poor Yorick, Shakespeare's guide is available only on floppy.

Scientific American goes with its first CD-ROM title called *Exploring Planetary Worlds*, by David Morrison. Using video and animation clips plus data from the most recent space exploration, this disc is designed for a general audience. W. H. Freeman, a division of Scientific American, is the publisher and this CD marks the first CD-ROM from the company. For more information, call (212) 645-9870.

The Adventures of Ninja Nanny is one of several new CDs designed for high-end systems with 486 (minimum) computers, 8 megs of RAM, and a double-spin CD-ROM. These discs contain videos that need the 300Kb transfer rate of the 2x CD-ROM drive and processing power of the 486 to display the pictures and data properly. A single-speed version is available but without the 110 video clips included. From Silicon Alley.

Librarians, take note! *Electronic Dewey* is here. With all four volumes of the DDC 20 index, this disc provides full text indexing, an online search and database with all the changes published in DC&. Forest Press is the publisher but at \$400, it is a bit pricey for home use. No doubt a lot of libraries will grab this one. Forest Press is at (800) 848-5878.

Low-cost CD-ROM suppliers

The competition for CD-ROM discs is heating up and street prices are often half the manufacturer's suggested price. Here are a few suppliers who have listed very low prices; some will sell bundles of CD-ROMs without requiring a drive purchase.

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National CD-ROM	(800) CDR-OM13	7th Guest (\$99 vs. \$39)
Rock Bottom CD-ROM	(800) 295-8701	7th Guest (\$99 vs. \$40)
Telecentral	(800) 799-9917	King's Quest 6 (\$79 vs. \$35)

Do It Yourself Discs

The playing field for low-cost CD-ROM recorders is getting crowded these days, which means that creating your own CD-ROM is much easier and more economical than ever before. There are several recorders under \$5,000 and the cost of the media has dropped from \$80 a disc (about 14 months ago) to as little as \$25 per disc, which is now competitive with many magnetic tape solutions for 600 megs of data.

Speaking of write-once discs, Trace is now shipping a CD-ROM printer that will print titles onto specially coated CD-R(recordable) media. In conjunction with Trace's CD-ROM duplicator, small volume runs of CDs can be created in the desktop environment. The printer uses an ink transfer system to achieve 360 dpi resolution. Trace is at (408) 437-3381.

PlayWrite is a recordable CD-ROM system that works with UNIX, DOS, and Mac platforms. At only \$3,899, the package includes a Ricoh CD-R drive, software from Dataware

Technologies to prepare the disc, instructions, and support. Microboards can be reached at (800) 225-4414.

Meridian Data is using the Kodak PCD Writer 200 in a network design that allows network users to access a CD-ROM writer. The product, called Netscribe, looks like a shared network resource, allowing users to store files onto the CD with copy commands or with drag-and-drop Windows actions. The system buffers all the data so that recording takes place later in a separate session. CD-ROM writers must record the entire disc non-stop or the disc becomes a fancy coaster for a coffee cup. Meridian is at (408) 438-3100.

You can also have a service produce your low-volume discs at prices under \$200 for the first copy and as little as \$50 for multiple copies. One such service is Eternal Archive Solutions, Inc in Connecticut. The first CD runs \$145 with multiple copies as low as \$45 each. They can be reached at (203) 759-0574.

CD-ROM & Optical Storage will archive DOS files for \$100 minimum for 100 megs of data to \$200 for 220 megs up to 560 megs. They accept the data on a hard disk, QIC 80, Jumbo 250, and 8 mm formats. They can be reached at (800) 783-3ROM or (813) 799-6007.

Young Minds has been in the CD-ROM business for quite a while and is offering UNIX-based CD-ROM writing packages, complete with software and hardware. The package called CD Studio combines the MakeDisc mastering software with a MediaMaster controller and CD-ROM writers from Sony, Pinnacle, Philips, and Kodak. The MediaMaster controller allows networking and functional testing of the CD-ROM master before cutting the CD. Young Minds ships systems compatible with HP-UX as

well as 20 other UNIX platforms. They can be reached at (909) 335-1350.

Portables with CD-ROMs

Portable PCs have not had much room (or incentive) to place a CD-ROM drive internally, but a new crop of PCs with CD-ROM drives is starting to show up. Panasonic's CF-V21P is a 6-pound portable with a color screen and a miniature CD-ROM drive that replaces the PC's floppy. Now this isn't a full sized drive: it is a 3.5-inch CD-ROM that will not be able to read 5.25-inch standard CDs, but for corporate solutions, where the 3.5-inch format can be produced for special uses, it is an ideal solution.

The 3.5-inch drive stores only 180 megs of data (compared to 650 megs for a regular CD-ROM disc), but the smaller discs can be read on larger drives so there is some compatibility. The Panasonic notebook computer comes in a variety of configurations, including monochrome (about \$2,600), a pen-based screen at \$3,000 and a color screen at \$4,200. All models have four megs of memory, a 486/25 processor, and a 120-meg hard disk. The optional CD-ROM drive is \$500 extra.

Toshiba's T6600C series has an optional CD-ROM drive in a portable package with a (fast) 486/66 processor, 8 megs of RAM, color screen with SVGA card, built-in speakers, and a 500-meg hard drive. SCSI-2 is available on an external port and the CD-ROM is double speed with a 200 ms access time.

Faster drives

Double-speed may be old technology this year! NEC has already started shipping triple-speed (450 Kbytes/sec) drives, with Pioneer still leading the way with quad-speed (600 Kbytes/sec). The

Pioneer drive is still a six-disc changer so it is well over \$1,000, but look for quad-speed drives from NEC (MultiSpin 4X Pro) at just under \$1,000 and a 4x speed drive from Plextor (was Texel) sometime this summer.

High-speed CD-ROM drives still lag in seek-time performance, with the best still more than 170 ms and the average around 250 ms. Sequential access such as video and audio applications will benefit tremendously, thus allowing larger video images and faster refresh rates, but databases and information research discs will not seem much peppier since the majority of the access time will be seeking and not reading.

NEC has a program to upgrade the CDR-83 to a CDR-84 (adds double-speed capability). Trantor Systems (known for their line of parallel to SCSI adapters) will also perform the upgrade for -73 and -83 drives.

MPC 2 standard

Speaking of high-speed drives, last summer, the MPC (Multimedia PC) Council defined a second level of MPC compliance, MPC level 2. Minimum standards for MPC 2 stipulate a 486-based PC, 8 megs of RAM, a double-speed CD-ROM drive, Windows 3.1, and a Windows-compatible sound card. Yes, the requirements are going up but the benefits are phenomenal. New titles are starting to appear even now with MPC-2 stickers, and while these discs can be read by the older 386 machines and standard-speed drives, video and audio may be inadequate with video images jerking across the screen, and on small machines, there may not be enough memory to run the application. ■

Bill Hassell is a support engineer at the HP Response Center in Atlanta, Georgia.

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CIRCLE 110 ON READER SERVICE CARD



CSL/HP-UX

It's THE FIRST DAY of a new year and I'm sitting at my small system at home enjoying a great college football game. As I'm typing a few words in between plays, it occurred to me how much the outcome of a big game is like some of the situations we encounter in day-to-day life. Consider just how tough it is to handle the outcome of a big game. The winning team can certainly savor its victory, but for how long? Spring will come, and thoughts of the next season will overshadow that victory. The coaches need to start thinking hard about putting together the team for the next season. Players go back to their studies, the seniors starting to plan for graduation and entering the job market. The losers are also feeling some frustration, disappointment, maybe even guilt. Life goes on, so you pick yourself up, brush off the dust, clean your wounds and move on. Each person starts looking forward, considering the next challenge, creating the strategies and planning the actions for dealing with the future.

As we consider the future of Interex, sometimes it's good to take stock of our successes and our failures. Others within Interex and I have been sharing these successes through the pages of *Interex Press*, *Interact*, and *hp-ux/usr*, and it is especially gratifying to see the positive responses the organization has been getting. Interex has come a long way, especially in the last two years. A lot has changed and some things remain pretty much the same, yet we exist in a swirl of activity around us that often is immensely complex and difficult to deal with. We need to keep moving along, continually poking at the future and thinking about how we might fit in. Since the last time I wrote, I have been probing at some things that I thought might be of interest to you.

The System Administrators Guild, SAGE, along with USENIX sponsored the seventh System Administration Conference in early November. I had the good fortune of attending the conference this year. It is a unique event in that it is focused on a single area of computing. It also tends to draw together most of the recognized experts in systems administration from across the UNIX industry. People like Rob Kolstad, Eric Allman (author of *Sendmail*), Tom Christiansen (of Perl fame), and Evi Nemeth (author of one of the most popular books on administration). Even though this gathering tends to have a slight Sun (as in Sun Microsystems) flavor, HP was well represented in both attendees as well as presenters.

One of the key points echoed throughout the week was that system administration is rapidly becoming the most pivotal issue in new installations. The decision makers are no longer focusing on the hot hardware or application packages, but are basing their selections on maintainability and support of these new systems. Most of these managers are not really thrilled with some of the current rhetoric they are hearing. Many of them are betting their businesses on these new systems, and they need some assurances that we're with them. What the administrators need to do is continue to upgrade our business and technical skills and begin to rein in the independent minded culture that is the tradition in the UNIX community. Needless to say, this message was not received with great enthusiasm, although many in the community are taking it much more seriously than before.

The other important message from this conference revolves around the processes, procedures, and tools of the

system administrator. The "openness" of the UNIX operating system has spawned a whole generation of people with in-depth knowledge of the technologies that are so widely used today. Just as system managers on RTE and MPE would frequently roll their own tools, the UNIX community is coming up with *lots* of software to solve many of the classic administration problems in UNIX. This creative spirit is very helpful, but it tends to spawn multiple solutions to the same problem, without adding significant value to the overall task. What our managers perceive is a lack of collective wisdom and professionalism that is focused on meeting their business needs, something they always got from their proprietary system vendors. If UNIX and open systems in general are to flourish, we need to discard the "Not-invented-here" syndrome and our independent minded attitudes in favor of a more collaborative approach. We must seriously consider looking beyond ourselves and tapping into the "best-of-breed" processes, procedures, and tools to solve the most significant issues we face. We can no longer afford the luxury of rolling our own.

As a member of the Contributed Software Library committee at Interex for going on 10 years now, I strongly believe that the CSL can play a very significant role in this collaboration. Many of the members I talk to would like to maximize their use of the CSL to benefit their organizations. But in order for this collaboration to happen, the CSL must continue to rely on members contributing to the library with the best-of-breed tools that they might be using. We will continue to utilize some alternative sources like the Internet, but the best contributions usually come from people with new ideas who are actively solving problems at their sites. It is in the sharing of your ideas with the rest of us that we all will be successful. If you think you have a better way, send it in! There are lots of people in Interex who will willingly work with you to improve your ideas. When we work together as a team, then we can all savor our success, even for just a little while. ■

Paul Gerwitz is chairman of the CSL/HP-UX committee and is a system analyst at Eastman Kodak Company in Rochester, New York. He can be reached at 716-477-3067 or e-mail at gerwitz@interex.org or gerwitz@kodak.com.

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CIRCLE 95 ON READER SERVICE CARD



Product Focus

HP HAS ANNOUNCED LOW-END workstations and servers, which use HP's new PA-7100LC RISC microprocessor with built-in multimedia capabilities and high performance. Because of the low-cost chip design, HP claims that the new HP 9000 Model 712 workstation and E Series server offer the value of a PC but the performance, reliability, and functionality of midrange UNIX-based systems.

The entry-level systems are components of HP's new Enterprise Desktop initiative, which, according to Pierre Bouchard, product marketing manager of HP's Workstation Systems Group, is targeted at "individuals who need to work in a collaborative way, across distributed, work-group environments, and they have to be working with mission-critical applications." In support of this initiative, HP also has announced enhanced multimedia software, a desktop builder's kit, and terminal emulation software.

floating-point performance).

The base Model 712 is configured with 16 MB of RAM, expandable to 128 MB. Board options run either \$80 per megabyte (in 4-MB boards) or \$120 per megabyte (in 8-MB boards). Base models also include 260 MB of disk storage, expandable to 1 GB for an additional \$1,700. An external mass storage capacity of 14 GB is provided as well.

The 712 provides users with two I/O slots, which allow users to connect to a LAN while using telephony options. Network connectivity offered includes EtherTwist LAN, LAN AUI, and optional Token Ring, X.25, second LAN AUI, and second serial port configurations. The standard interface in the integrated I/O subsystem includes single-ended SCSI-II, RS-232C, Centronics, and two PS/2 connectors.

Other features included in the Model 712 are Fast Boot, for quick system startup, and Soft Power-Down, designed to shut the system down quickly and automatically in the event of power disruption.

New Software

With added multimedia, networking, and ease of operation features, the Model 712 leverages workstation strengths specifically for real-time, client-server, collaborative computing. The workstation is capable of employing the new features found in MPower 2.0. This multimedia application features Digital Video, for playback of MPEG-compressed digital video clips at up to 30 frames per second. In addition, MPower 2.0 contains a TeleShare option, offering "point and click" access to phone, fax, and data within the Model 712. MPower also maintains previously available features such as the Shared WhiteBoard, for real-time collaborative annotation of images, documents, and



HP 9000 Model 712/60 running Wabi 1.0, MPower 2.0, RTW, and AMI Pro for UNIX from Lotus

Model 712 Workstations

HP's 60-MHz Model 712/60 and 80-MHz Model 712/80i workstations are intended to be highly functional yet cost-effective alternatives to networked PCs. According to HP's performance comparisons, the base configured Models 712/60 and 712/80i, outfitted with 15-inch color monitors, outpaced comparably priced SPARC, IBM, SGI, and Pentium workstations. The HP 9000 Model 712/60 achieved a SPECint92 (which measures integer performance) rating of 58, and the HP 9000 Model 712/80i scored a SPECint92 rating of 84; both models rated 79 for the SPECfp92 benchmark (which measures

data; SharedX, for real-time sharing of X Windows; and multi-vendor, multi-platform support for conferencing with any X device. MPower also offers 16-bit, CD-quality, stereo audio. Based on HP VUE 3.0, MPower contains an online help system with hypertext and hypergraphics links.

MPower is also available with the Ready-To-Wear (RTW) Desktop Builder Kit, a set of software and documentation intended to help IT managers develop a desktop "and then take a cookie-cutter approach to ship that same desktop and install it on all of the systems in a corporate-wide network," Bouchard said. The kit contains software for customizing desktops and standardizing integration of applications, configuration files for creating a simplified, familiar user interface, and automated scripts for preconfiguring networking tools.

HP also offers two new PC emulation products to run on its Series 700 workstations, HP's Wabi 1.1 and Insignia Solution's SoftWindows. Wabi 1.1 is a PC software emulator that allows users to run 13 popular MS-Windows applications—word processors, spreadsheets, presentation graphics, databases, desktop publishing, communications, and project management software—on Series 700 workstations and X stations. Wabi is integrated with HP VUE and runs the specified applications at 486-class performance. SoftWindows provides workstation users access to DOS applications, a wider range of Windows applications than available with Wabi, and access to PC servers; however, HP notes, it lacks the graphics performance and HP VUE integration found in Wabi.

E Series Servers

The low-end, 7100LC-based counterpart to HP's desktop release is the HP

9000 E Series server, available in Models E25, E35, and E45. Sanjay Srivastava, systems marketing manager for HP's General Systems Division, said the servers allow HP to "take midrange functionality, midrange performance, and offer it at entry-level prices." The new systems are designed to work with systems management software such as OpenView, in CASE environments, and with various 3-GLs, 4-GLs, tools, and RDBMSs.

The "no compromise" servers are intended to provide replicated applications to remote and branch offices and in retail stores. With replication, Srivastava explained, "you're really trying to push the business decision-making flexibility out to the remote locations (with) the advantages of system management and networking—without having UNIX-trained people out in each and every site."

The E Series features 2 or 4 HP-PB I/O expansion slots, up to 16 RS-232 ports, 144 GB of disk storage (4 GB internal), and a remote console. The systems initially are configured with 16 MB of RAM and are expandable to 512 MB, which can be added to the system for \$1,280 per 16-MB increment. An E25 configured with 16 MB of memory, a 500-MB disk drive, and a two-user license for the HP-UX 9.04 operating system is priced at \$9,569, roughly \$7,000 less than what HP considers is IBM's low-end counterpart, the RS/6000 34H. "This price is really positioned right on top of the PC server marketplace," said Srivastava.

But the 7100LC-based machines surpass Intel-based performance, offering an estimated 80 transactions per second (tps) on the E25 and an estimated 155 tps on the E45. Because the E25 is expandable to E35 and E45 performance with a board upgrade, the servers provide for a growth path not available with PCs.

PRICES (U.S. LIST)

Model 712 Workstations

The base price includes 16 MB of RAM, 260 MB of disk storage, 2 HP-PB I/O slots (expandable to 4 slots), single-ended SCSI-II, RS-232C, Centronics, two PS/2 connectors, Fast Boot, and Soft Power-Down.

Model 712/60, 15-inch color (1,024 x 768):	\$ 3,995
Model 712/60, 17-inch color (1,024 x 768):	\$ 5,770
Model 712/60, 17-inch color (1,024 x 1,024):	\$ 6,170
Model 712/60, 19-inch color (1,024 x 1,024):	\$ 7,770
Model 712/80i, 17-inch color (1,024 x 768):	\$ 8,820
Model 712/80i, 17-inch color (1,024 x 1,024):	\$ 9,220
Model 712/80i, 19-inch color (1,024 x 1,024):	\$10,820

E Series Servers

The base price includes the CPU, 16 MB of RAM, 8 RS-232 ports, integrated 802.3 LAN interface, single SCSI interface, parallel Centronics support, and installation services for any processors, peripherals, and I/O networking cards.

Model E25:	\$ 4,130
Model E35:	\$ 6,480
Model E45:	\$ 9,480

Additional Software

MPower 2.0:	
client license	\$ 195
server license	\$1,295

The RTW Desktop Builder Kit:

client license	\$ 195
server license	\$ 995
Wabi	\$ 395
SoftWindows	\$ 549

Features that can be added to the base configuration include Instant Ignition, which is preloaded software for easy installation, uninterruptible power supply and high-availability software, and specialized services for planning, implementation, and ongoing support.

The Model 712 workstation, E Series server, MPower 2.0, RTW Desktop Builder Kit, and PC emulation products are available now.

Michelle Pollace is the New Products editor for hp-ux/usr.

Continued

Insight 1.1

IF YOU ARE LOOKING FOR A PROGRAMMER who can instantly find the memory corruption and pointer problems in your code and can immediately recognize incorrect arguments to UNIX system calls, Motif, X, and more, ParaSoft Corporation has a suggestion: get insight.

Insight 1.1, that is—the company's C source code debugging tool. With Insight, ParaSoft aims to help programmers eliminate the bugs that Arthur Hicken, ParaSoft's marketing manager, said, "are all too typical in PC and workstation (products)."

Insight is designed to detect all memory reference errors when that reference is executed, using comprehensive "knowledge" of every data structure and every variable accessed in the source program. It checks all types of memory references, including

those to static, stack, shared, and dynamically allocated memory. When Insight finds a problem, it provides a complete diagnosis, including the name of related variables, the line of source code containing the error, a description of the error, and a stack trace.

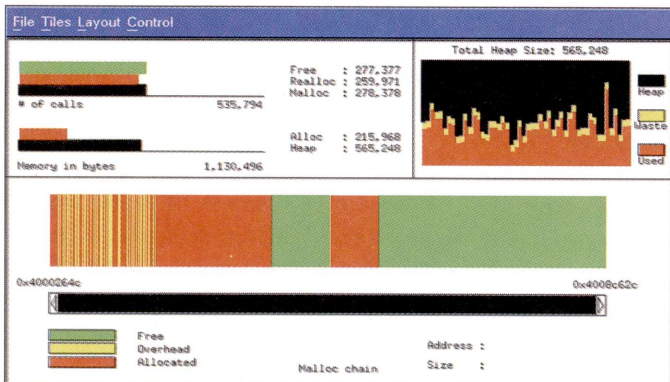
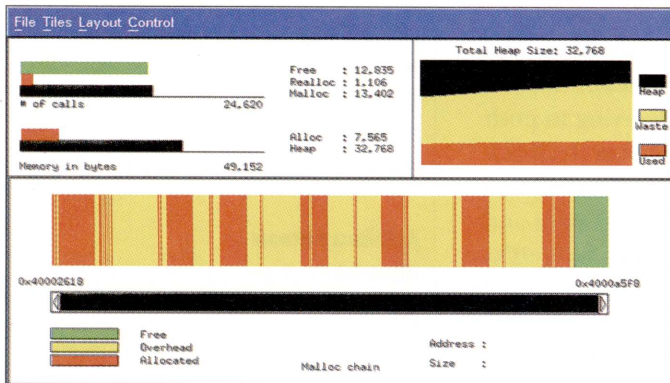
The product also is built with "knowledge" about every standard UNIX systems call, the X Window system, Motif, and many other popular libraries, said Hicken. It uses this knowledge to find all library interface errors, such as mismatched argument types or function declarations, out of range or otherwise invalid arguments in library calls, and errors returned by library calls.

This approach to detecting library interface errors differentiates Insight from other debuggers, said Hicken. "The competitors will tell you, 'Here's a bug and where it occurred in the library.' But you can't always fix the library, because you're using someone else's," he observed. To make the debugging facility more useful with libraries, "we make sure your argument is correct; you need to make sure you used (the library reference) properly."

The product is also different, Hicken continued, because it is a source-code level debugger. He noted that the competing products "work at the object code level." He explained that source-code level debugging is more accurate, finds more bugs, and can provide more specific information on where memory was lost and where allocations belong. As a result, many product reviews conclude, "We always find more bugs than our competitors," Hicken stated.

Insight is compatible with third-party debuggers and compilers and creates no additional files in other directories, according to ParaSoft. The product is used by processing the program to be tested with the Insight program in place of the normal compiler. This creates a version of code that includes calls to the Insight library. Error reports can be generated by simply relinking the program in question, with no recompilation required.

Along with no runtime license restrictions, these features are designed to allow the



developer to test the software in customers' environments. Hicken suggested that the customer needs only to run the software (previously compiled with Insight at the developer's site), and fax or e-mail the output of the file back to the developer.

The product is comprised of four distinct modules, each of them separate programs: the Insight module, which is the basic runtime debugger; Invision, a GUI for presentation of data; Inuse, a GUI for presentation of memory; and Total Coverage Analysis (TCA), to make sure all functions have been checked.

The Insight module finds algorithmic anomalies, bugs, and deficiencies by creating a Data Track file, which contains a "video recording" of a program's execution. This recording is played back using the Invision module, which shows how the program manipulates data. It displays simultaneous, synchronized image of data values, memory access patterns, and the source code being executed. The animation of program and memory references is designed to help programmers understand and optimize algorithms.

What Invision does for data, Inuse does for memory. Inuse is a graphical utility that provides real-time animation of an application's dynamic memory allocation. It looks at algorithms that "leak" memory. Such applications typically pass in-house testing and crash only when presented with very large datasets or extended running times at customer sites, Hicken explained.

TCA is designed to allow users to see how their code has been tested, indicating how much of the software has been tested and providing simple reports. Customization and regression capabilities are designed to allow users to monitor software for improvement and decide when to ship it. This feature, Hicken noted, can help programmers evade "Murphy's Law" of software development: If only one function escapes testing, "that's the function customers will use first."

Insight is available for HP 9000s and other UNIX platforms,


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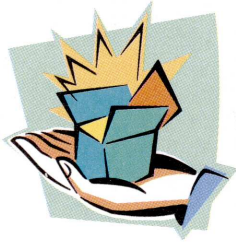
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Michelle Pollace is the New Products editor for hp-ux/usr.



New Products

New from PROCASE

Source Code Analysis

PROCASE Corporation has announced SMARTsystem Version 2.1, which includes new functionality, customer bug fixes, and performance and usability improvements. SMARTsystem is designed to graphically display code structure for providing information about errors and dependencies and performing impact analysis. Release 2.1 supports HP 9000 Series 700 and other UNIX platforms.

It also features a makefile reader to facilitate building the database and getting started. Version 2.1 provides additional code comprehension capabilities by showing dependencies involving global data and function pointers, in addition to the former display of function and library calls. It also provides new mechanisms for uncovering undefined CPP macros.

Integration with CDE

PROCASE Corporation also announced the integration of its SMARTsystem 2.0 software development product with IDE's C Development Environment (CDE).

CDE works with a variety of tools to reverse engineer source code. SMARTsystem is designed to reverse engineer very large programs (over 1,000,000 lines of code) and communicate more information than other systems about the code to the front-end tools. SMARTsystem does not require that the code compile successfully, so it is suitable for embedded systems development, and it can handle a wide variety of C dialects, the company notes. It can also handle code with errors in it or work with partial systems.

The SMARTsystem 2.0/CDE integration package is currently shipping on the

Sun SPARC platform, with an integration package on the HP platform scheduled to follow. Customers will purchase SMARTsystem and CDE separately from each company, and the integration package will be offered through PROCASE.

Contact PROCASE Corporation, 2694 Orchard Parkway, San Jose, California 95134, phone: (408) 433-9500, fax: (408) 435-2600.

JPEG Compression Daughter Card

MediaMagic, Inc. has announced the Joint Photographic Expert Group (JPEG) Compression Daughter Card for the HP 9000 Series 700s. The Daughter Card is designed to add compression to the true 24-bit full-motion video and audio provided by the MediaMagic Base Video Board and Audio component.

The Compression Daughter Card is designed around C-cube's CL550 image compression processor and provides real-time synchronized, full-motion video and audio for recording, storage, and playback from internal disk. It also allows capture rates exceeding 30 fps at 640 x 480, complete pixel replication support for sizing stored files, and file compression ratios at 100:1 at the size recorded.

The JPEG Compression Daughter Card is shipped with an installation manual and includes a one-year warranty on hardware with 90 days of free software support.

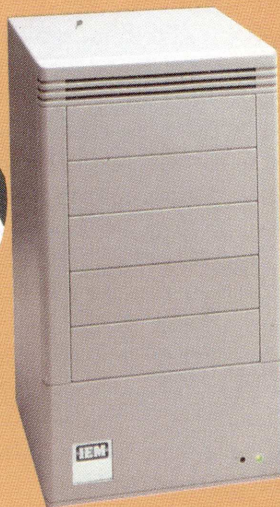
Contact MediaMagic, Inc., 222 Municipal Drive, Richardson, Texas 75080, phone (214) 669-3408, fax: (214) 234-6280.

Windows-to-UNIX Porting

MainSoft Corporation has announced commercial availability of MainWin Software Developers Kit, designed to provide rapid and cost-effective porting of

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Multiple version of an application can be created for Sun, HP, IBM, and SGI workstations from the same code base that supports Windows 3.1. The product enables developers to maintain the look and feel of the original Windows application and does not alter the underlying code of the original application, the company notes.

Users also can switch to the Motif look "on the fly." MainWin provides the Windows API (application program interface) services implemented natively on Xlib. Applications use the MainWin library to directly execute the Windows commands on the UNIX workstation.

The MainWin Software Developers Kit is priced at \$5,000 for the first copy and \$2,000 for additional copies. The end-user environment, MainWin for Workstations, is priced at \$195. The development tool is available directly from MainSoft (1-800-MAINWIN) or through select systems integrators.

Contact MainSoft Corporation, 883 North Shoreline Blvd., Suite C-100, Mountain View, California 94043, phone: (415) 966-0600, fax: (415) 966-0613.

New from ANDATACO

8-mm Subsystems

ANDATACO has announced the Encore Plus and Encore Plus Dual Array tape subsystems. The Encore Plus 8-mm tape subsystem offers a status display, a tape mode selection switch, and industry-standard IBM, DEC, or HP tape drive emulation.

The product's 40-MHz SCSI bus co-processor is designed to provide an intelligent front end to the Exabyte 8505 tape drive. The Encore Plus SCSI

Postal Code Verification

Group 1 Software has released CODE-1 Plus/UNIX for the HP 9000 and IBM RISC 6000. The release of CODE-1 Plus/UNIX for other UNIX platforms is anticipated in the near future. CODE-1 Plus/UNIX is said to meet all U.S. Postal Service (USPS) requirements for coding accuracy and is CASS-certified.

The system is designed to allow mailers to standardize and correct U.S. addresses and to confirm, correct, or add postal codes, including carrier route, ZIP+4, and delivery point codes. By validating postal codes and addresses, mailers can comply with USPS automation requirements for business and Third-Class mail and secure substantial discounts on postage.

CODE-1 Plus can operate in either a batch or online mode. In addition, when provided with a ZIP code and limited address information, the system can return verified, standardized addresses.

CODE-1 Plus/UNIX lists from \$10,000-\$42,000, depending upon mail processing levels, and is delivered with a compressed version of the USPS ZIP+4 database.

Contact Group 1 Software, 4200 Parliament Place, Suite 600, Lanham, Maryland 20706-1844, phone: (800) 368-5806, fax: (301) 731-0360.

co-processor drives a backlit, SuperTwist LCD status display, runs the dual drive array and tape drive emulation firmware (optional), provides a mini-SCSI analyzer function, and offers advanced drive test and exercise features. The Encore Plus display indicates the current tape operation, total data transferred, average transfer rate, remaining tape capacity, ECC or data rewrite percentage, mode switch status, and drive cleaning status.

The Encore Plus Tape Array subsystem offers the same features as the Encore Plus in a dual tape array configuration. The two-drive system provides the ability to cascade, autoswitch, mirror, and copy offline with verification.

Optional emulation software allows both Encore Plus 8-mm tape subsystems to emulate an HP 4-mm DAT tape drive (for HP 9000 Series 700 and Series 800 systems). List price for the Encore Plus/10 starts at \$4,295. The Encore Plus Tape Arrays have a base list price of \$7,500.

Xcelerated Systems Acquisition

ANDATACO also announced the acquisition of Xcelerated Systems, Inc., developers of Macintosh emulation software for Sun, HP, and RS/6000 workstations.

Xcelerated Systems created Likem, a Motorola 68000 software emulation engine designed to allow off-the-shelf Macintosh applications to run under MacOS on Sun, HP, and RS/6000 workstations. Likem also supports AppleTalk, AppleShare, and TCP/IP, as well as Microsoft Mail and QuickMail.

Included in the acquisition of Xcelerated are all Xcelerated assets and Xcelerated's software development team.

Contact ANDATACO, 10140 Mesa Rim Road, San Diego, California 92121, phone: (800) 334-9191 or (619) 453-9191, fax: (619) 453-9294.

DEC-to-HP Networking

Thursby Software Systems, Inc. (TSS) has announced TSSnet, designed to provide easy-to-use and cost-effective access to corporate data and legacy applications located on DEC VAX/VMS systems. TSSnet for the HP 9000 is software-only and runs on HP 9000 workstations. TSSnet provides transparent access with no alternations to the VAX systems or the existing DECnet environment, the company notes.

TSSnet allows the HP 9000 to participate in networks as a full DECnet end node and offers network terminal and printer support under the Local Area

Transport protocol. TSSnet makes the HP 9000 a fully functional DECnet Phase IV end node (with guaranteed Phase V compatibility), while retaining coexistence with other networking protocols. The product is designed to provide remote login between HP 9000s and VAX/VMSs or other TSSnet-configured systems.

TSSnet is said to bring the fastest and most comprehensive file transfer utility available to the HP 9000, allowing for complete, bi-directional, single, or multiple file manipulation between remote and local nodes on a network. Other services include a unique software gateway that enables DECwindows and other X window clients to run under the HP 9000's X window server. TSSnet also ties the UNIX, VMS, and Apple Macintosh mail systems together with a transparent mail gateway. Extensive network management tools, network testing, and task-to-task support using AT&T streams are also offered by TSSnet for the HP 9000.

U.S. list prices for TSSnet for the HP 9000 begin at \$1,995.

Contact Thursby Software Systems, Inc., 5840 W. Interstate 20, Suite 100, Arlington, Texas 76017, phone (817) 478-5070, fax: (817) 561-2313.

Project Management

National Information Systems, Inc. (NIS) has announced the availability of the ACCENT GraphicVUE Project Management System, Version 1.50. ACCENT GraphicVUE, Version 1.50 introduces many new user-requested features.

Version 1.50 now supports OPEN LOOK and Motif, multiple-directory file processing, Granada Enhanced Graphics option, enhanced spreadsheet editing, networked licensed management through the FlexLM License Manager, summary activity support,

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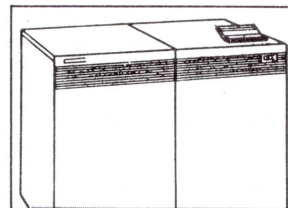
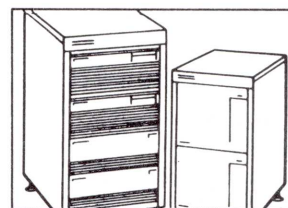
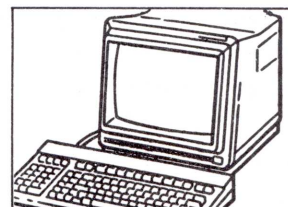
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and time-now/time-remaining schedule display.

ACCENT GraphicVUE is available on HP 9000 Series 700s running HP-UX Version 8.05 or greater and other platforms. The network version of ACCENT GraphicVUE, which includes multiple-project processing, starts at \$2,495.

ACCENT GraphicVUE allows an activity to be moved and its detail data to be viewed while in either the Gantt chart or project network display mode. Data can be entered in either a spreadsheet format or through a data entry window while in Gantt or network project mode. Multiple resource histograms can be viewed in parallel with the Gantt chart in the same window. Networked workstations support distributed planning, and UNIX-based project management offers a long-term growth path for successfully completing organizational goals.

Contact NIS, 4040 Moorpark Avenue, San Jose, California 95117-1852, phone: (800) 441-5758 or (408) 985-7100, fax: (408) 246-3127, e-mail: info@nis.com.

Ada and C Code Analyzer

Software Systems Design has announced the release of Version 3.0 of QualGen, a quality analysis tool for Ada or C. QualGen analyzes Ada or C programs to determine over 250 measurements/metrics that define various quality factors. Metrics including Halstead, McCabe cyclomatic, as well as metrics specifically designed for Ada or C, are automatically captured from their source code, the company notes. Users can customize the system by defining their own metrics from the primitive measurement calculations. Quality trends graphs can be examined online or printed to any PostScript device. Version 3.0 is designed to provide the ability to pinpoint the

Bernoulli Disk Drives

Bering Technology, Inc. has introduced the MultiPac 150 Series, a new family of 150-MB removable Bernoulli disk subsystems for HP 9000

and 1000 computers. The drive series features the latest high-capacity 150-MB removable MultiDisk Bernoulli cartridge drive from IOMEGA Corporation. The drives are designed for primary and secondary storage, high performance, unlimited expandability, archiving, easy data transportability, and data security.

The MultiPac 150 models provide a 25-ms average access time with 110,000 hours MTBF, the company notes. Bernoulli technology's important advantage over other removable hard disk drives is said to be the ability to withstand shock vibration to 1,000 Gs. The cartridges carry a five-year warranty and are backward-compatible with Bering's 90-MB (read/write) and 44-MB (write only) cartridges. The drive also supports multiple cartridges with other capacities of 35, 65, and 105 MB for specific capacity requirements. The Bering MultiPac 150 series also includes Bering's unique "SC" feature with both HP-IB and SCSI interfaces.

The MultiPac 150 subsystems are sold in several configurations and are available immediately with shipment 30 days ARO. Pricing ranges from \$4,390 for the single Bernoulli drive subsystem to \$7,690 for the combination Bernoulli with 1 GB hard disk.

Contact Bering Technology, Inc., 1357 Dell Avenue, Campbell, California 95008, phone: (408) 379-6900.



locations in the source code that are causing quality problems.

QualGen is priced from \$2,500 per CPU and is currently available on a wide variety of host computers, including HP 9000s.

Contact Software Systems Design Inc., 3627 Padua Avenue, Claremont, California 91711, phone: (909) 625-6147.

Security Assessment Tool

Raxco, Inc. has announced the general availability of Security Toolkit/UNIX (STK/U) Version 3.0, a comprehensive security assessment tool for UNIX systems. The new version will further facilitate the automation of regular and systematic security checks and ensure proper system security implementation across UNIX networks.

Version 3.0 of STK/U offers a network-

wide security summary of all the specified hosts. The "green, yellow, red" rating system allows users to see at a glance whether any security problems were discovered, and numeric ratings can be used to gauge improvements in system security. A new File Access module is intended to allow system administrators to display users having access to a list of user-specified critical files. Also featured are a remote installation mode, modeless dialogue boxes, lists of users with .rhosts and .netrc files, and host-level summaries and reports.

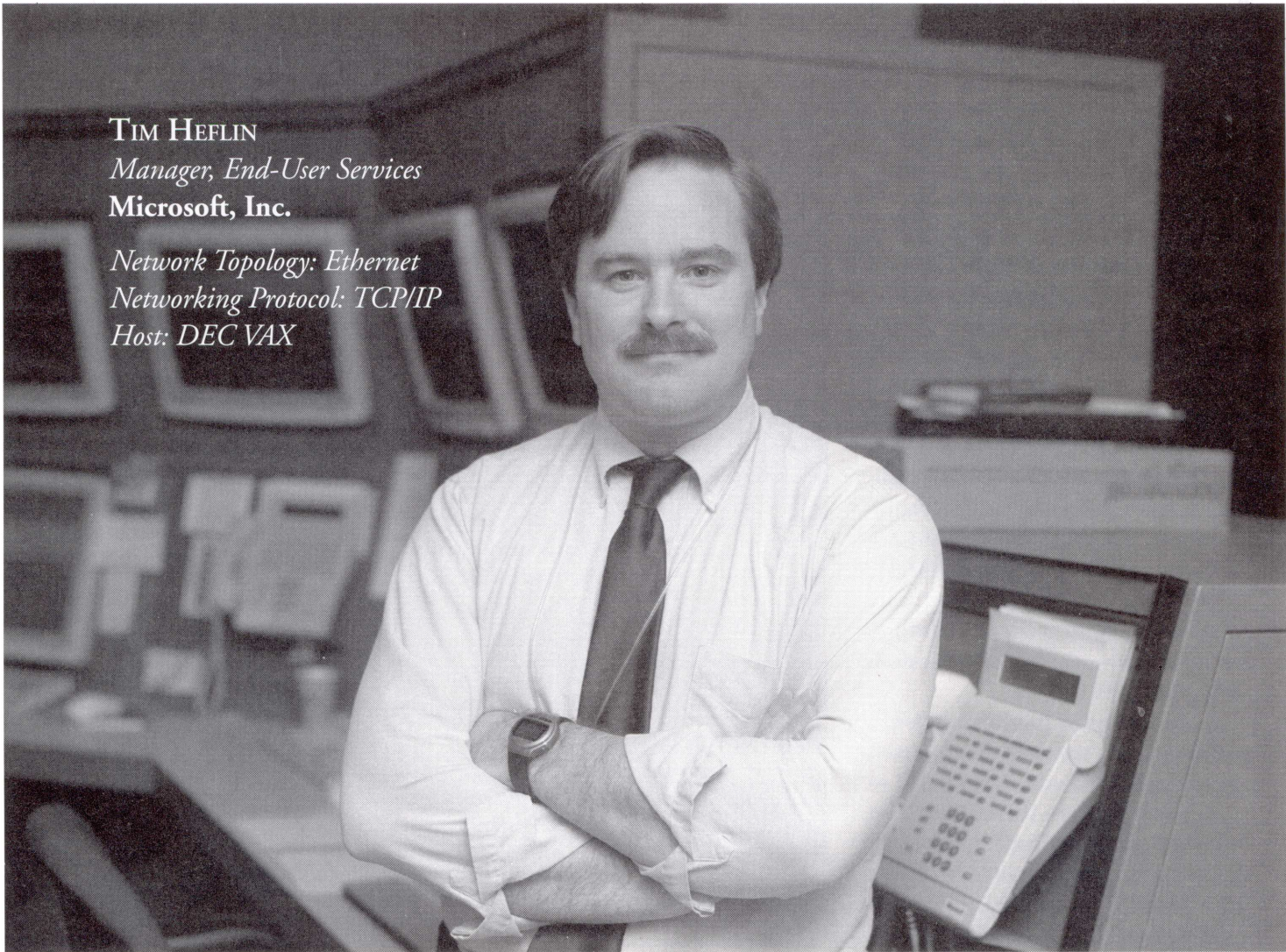
Security Toolkit/UNIX runs on HP 9000 Series 300, 400, 700, and 800 and is priced between \$250 and \$9,790, depending on platform.

Contact Raxco Inc., 2440 Research Blvd., Rockville, Maryland 20850, phone: (301) 258-2620, fax: (301) 670-3585.

TIM HEFLIN

Manager, End-User Services
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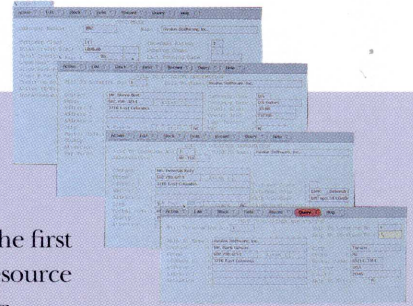


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Avalon Software's CIIM integrated applications



Extended Runtime UPSs

Network Security Systems Inc. (NSSI) has introduced two new 2-KVA (2,000-VA, 1,600-watt) UPSs and a new 1.2-KVA (1,200-VA, 960-watt) extended runtime model. The IPS/A.I. 2000 provides affordable power protection for large, high-powered servers, networked computers, and telecommunications equipment. An extended battery runtime version of the 2-KVA, the IPS/A.I. 2000X, is also offered. The new IPS A.I. 1200X is also an extended-battery runtime model. The products are available now. Prices start at \$1,599.

In the extended runtime models, a battery charger has been incorporated into each individual battery pack, so users can configure the UPS with an unlimited number of battery packs without increasing the required recharge time. The IPS/A.I. 2000 has a half-load runtime of 21 minutes and a full-load runtime of 7 minutes. The IPS/A.I. 1200X has a half-load runtime of 45 minutes and a full-load runtime of 17 minutes. Additional battery packs, which can be configured to meet any backup time requirement, are offered for \$459 each. All NSSI UPSs are microprocessor-controlled and capable of two-way communication via an RS-232 serial port. This enables the LanSafe II software to receive power failure notifications from the UPSs and react by performing an unattended orderly shutdown of a network's file structure.

Contact NSSI, 9401 Waples Street, San Diego, California 92121, phone: (619) 587-7950 or (800) 755-7078, fax: (619) 552-9162.

Network Management

Shany, Inc. has announced shipment of AlertVIEW Version 2.2, said to be the

Manufacturing Planning

Avalon Software, Inc. has announced a partnership with Intellection, Inc. The companies will deliver what is said to be the first fully integrated solution for enterprise resource planning and constraint-based scheduling.

Avalon will offer Intellection's Rhythm software as part of its CIIM family, a suite of integrated, client-server applications for manufacturing, distribution, and financials. The new module will expand CIIM functionality to include rapid-response manufacturing planning. The companies are also developing a new product, the Avalon Intellection Connection, to seamlessly link CIIM and Rhythm. Additionally, Avalon and Intellection will share technologies, ensuring that upgrades and new products will feature compatible technologies, user interfaces, and underlying product architectures. The Avalon Intellection Connection was scheduled to be available in 1994.

The Avalon Intellection Connection will enable CIIM to be the foundation for a rapid-response, client-server manufacturing solution. CIIM will serve as a repository for all information necessary for cycle planning, such as customer orders, inventory availability, labor and skill-level availability, and product structure. The new Rhythm module will access data necessary to create a constraint-based master schedule through the Avalon Intellection Connection and will provide the calculation power required to analyze how constraints affect the manufacturing and distribution cycle.

Contact Avalon Software, Inc., 3716 E. Columbia, Tucson, Arizona 85714-3414, phone: (602) 790-4214, fax: (602) 750-0822.

only network management enhancement program designed to troubleshoot applications running on networked PCs. The product now allows network administrators to manage multiple protocols from a single management console. AlertVIEW now provides improved remote access, support for Novell's NDMS and desktop SNMP, and compatibility with all major network management platforms, the company notes. AlertVIEW v.2.2 is designed to function in both LAN and WAN environments.

AlertVIEW v.2.2 also offers TCP/IP protocol support, support for SNMP alarms over both TCP/IP and IPX, and statistical views for improved reporting of application events. Additional new features include super VGA support, user interface enhancements, expanded help screens to improve ease of use, and a fully indexed, comprehensive manual.

The upgrade price of AlertVIEW v.2.2 is \$79. The price includes diskettes and the updated manual.

Contact Shany, Inc., 1101 San Antonio Road, Mountain View, California 94043, phone: (415) 694-7410, fax: (415) 694-4728.

Manufacturing Software

Cincom Systems, Inc. has announced a newly formed strategic partnership with Q-CIM Inc., which will integrate Cincom's SUPRA database management system (DBMS) with its family of manufacturing software solutions.

Q-CIM plans to offer its process manufacturing Enterprise-Resource Planning solutions in the Cincom SUPRA DBMS environment on HP 9000s starting in the first quarter of 1994. Q-CIM software is noted by its Fortune 100 customers to be one of the most efficient OLTP solutions running on the smallest to the largest

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- Network-related status display and configuration weaknesses.

SecurityAudit/UX RUNS ON ALL HP-UX BASED 9000 SERIES 700 AND 800 SYSTEMS, AND HAS BEEN SPECIFICALLY TAILORED TO ADDRESS PECULIARITIES OF HP-UX, SUCH AS PDF, ACL AND HP'S SHADOW PASSWORDS.

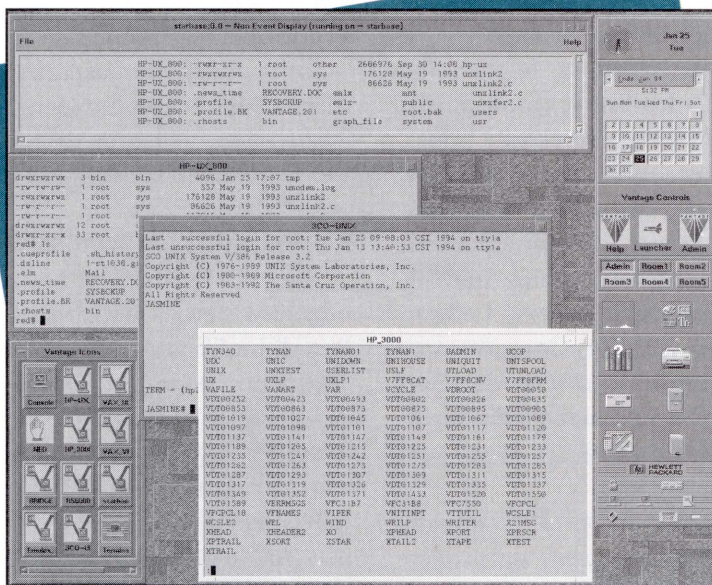
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Support Services

Polaris Service Inc. has announced that it has acquired ASJ Support Services, Inc. of Melbourne, Florida, strengthening its hardware and software maintenance services for users of workstations and servers manufactured by Sun and HP.

ASJ has provided support services for Sun, HP/Apollo, and other engineering workstations, computer-aided-design systems and associated peripherals since 1979. Polaris has focused on developing innovative support services for users and maintainers of Sun, HP/Apollo, and other UNIX workstation networks and delivering these services cost effectively.

Contact Polaris Service, Inc., 399 River Road, Hudson, Massachusetts 01749, phone: (508) 562-2495.

HP computers in existence today, according to the company.

Q-CIM will resell the Cincom/Q-CIM solution within the Cincom Eagle Advantage Reseller program, which offers pre-sale and post-sale consulting, flexible marketing support, professional product training, and other services designed to help each partner bring its applications to market faster. Each Cincom reseller partner also becomes part of an international network of sales professionals, working together to promote reseller solutions.

Cincom's SUPRA DBMS supports the development and execution of sophisticated high-volume production applications on a wide range of hardware platforms, from a single workstation to large-scale multiuser systems to multiple systems networked together.

Contact Q-CIM, Inc. at phone: (609) 275-3600, or Cincom Systems, Inc., 2300 Montana Avenue, Cincinnati, Ohio 45211-3899, phone: (513) 662-2300 or (800) 543-3010, fax: (513) 481-8332.

Business Management System

Abacus Data Systems, Inc. has announced ADAMS 4GL Version 6.4, which is designed specifically for the wholesale distribution and

light manufacturing companies who have high growth potential. With an emphasis on customer service, the basic solutions are integrated to improve the management of sales order processing, inventory, purchasing, and accounting.

The business management system is designed to handle the needs of both large and small operations. The product provides the ability to cross-sell and sell up, add complementary items, order by customers' part numbers, order from customer history, and reserve inventory for a customer. Other features include flexible automatic pricing by customer, online order entry, powerful search and inquiry capabilities, and extensive customer default setups. The product also provides numerous user-defined fields and the ability to run multiple windows and sessions.

The system consists of the following modules: Order Entry, Quote Entry, Inventory Control, Purchase Orders, Accounts Receivable, Automatic Back Order Release, Return Authorization, Stock Transfer, Lead Management, Catalog Management, Sales Analysis, Accounts Payable, General Ledger, System Maintenance, Commissions, Dunning Letters, and UPS Manifest. Modules can be purchased individually, as a complete package, or integrated with existing software.

ADAMS 4GL is written in Progress in a relational database system and runs on the HP 9000 Series 800s.

Contact Abacus Data Systems, 3601 Algonquin Road, Rolling Meadows,

Illinois 60008, phone: (708) 632-0303, fax: (708) 632-9991.

8-mm Cartridge Subsystem

Exabyte Corporation has announced that HP will now support the EXB-8505 8-mm Cartridge Tape Subsystem on HP 9000 Series 800s. The EXB-8505 is a half-height tape drive in a 5.25-inch form factor with a 5-GB native capacity and a 500 KB/second transfer rate. With compression, the drive can store 10 GB and transfer data at 1 MB/second.

A popular backup drive for UNIX workstations and servers, the 8-mm subsystem will be available in field-installable kits for HP's business servers, mini-towers, and 19-inch EIA racks. The kits can be integrated into an external storage enclosure or into a CPU enclosure. HP will service and support the EXB-8505.

A SCSI-2 device, the EXB-8505 is read/write compatible with the entire Exabyte family of 8-mm products. Its smaller size allows for ease of integration across multiple platforms, including workstations, networks, and minicomputers.

Contact Exabyte Corporation, 1685 Thirty-eighth Street, Boulder, Colorado 80301, phone: (800) EXABYTE or (303) 442-4333, fax: (303) 442-4269.

Macintosh-Based Administration

Pacer Software, Inc. has released upgraded versions of its PacerShare and PacerPrint file and print servers for HP 9000 Series 700 and 800 computers. The new release is designed to provide easy-to-use Macintosh-based administration and management, enhanced integration with other HP-UX-based file server products, and improved performance.

PacerShare is an AppleTalk Filing Protocol (AFP) 2.1-compliant implementation for HP 9000 Series 700 and

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So why pay extra for LAN connectivity when you can get the same LAN support in ONE package with HP and DEC terminal emulation. MiniSoft 92 provides connections for Telnet, Network Services, TCP/IP, Novell, Lan Manager, Banyan, Lantastic, Windows for Workgroups and many more. It also provides all the terminal emulation features upon which thousands of MiniSoft customers have come to rely.

Whether you are making serial or LAN connections in Windows, DOS or Macintosh environments, MiniSoft 92 will get you where you need to be at \$159. Call 1-800/682-0200 now to order your copy!

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MiniSoft 92 is a registered trademark of MiniSoft Inc. All other trademarks are the property of their respective owners.

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800 host platforms. PacerShare is intended to enable Macintosh users to mount and use HP-UX volumes and directories as if they were Macintosh disks. PacerPrint allows Macintosh users to print directly to HP-UX print queues as if they were LaserWriters. The new PacerShare provides complete interoperability with LAN Manager for UNIX, PC-NFS, and PathWorks for Ultrix.

The upgraded PacerShare and PacerPrint ship with PacerAdmin, a Macintosh application that lets system managers add, modify, and delete HP-UX users and groups. PacerAdmin also provides an easy-to-use graphical interface for creating and modifying PacerShare volumes and PacerPrint print queues. System administrators can use PacerAdmin to list, delete, and move jobs in HP-UX print queues as well as to manage host log files. With this release, PacerShare offers substantial, usable gains in real-world performance, the company notes.

The PacerShare and PacerPrint upgrade is available immediately. Pricing is based on the number of simultaneously connected users, starting at \$3,000 for a 20-user license. Existing PacerShare and PacerPrint users covered by maintenance plans will receive the software at no charge.

Contact Pacer Software, Inc., 7911 Herschel Avenue, Suite 402, La Jolla, California 92037, phone: (619) 454-0565.

Source Code Manager

UniPress Software, Inc. has announced a new version of Source Code Manager (SCM) with full X Windows support and an included Modification Request system. SCM is designed to manage the source and binary files of multi-programmer projects.

Electronic Forms, Barcoding

Xpoint Corporation has announced the acquisition of the Canadian-based company Pacific Genesys Development, Inc. and its electronic forms and barcoding software product, ReForm. ReForm is the first product Xpoint will introduce to the UNIX marketplace. ReForm takes the standard text output from UNIX applications, reformats it, merges it with a form template designed by the user, and distributes the merged forms to a laser printer or fax system.

ReForm supports any Postscript or HP-PCL4 or PCL5 compatible laser printers in addition to other fax software applications.

The software is available for SCO, Unix/Xenix, Interactive Unix, AT&T Unix System V for Intel Systems, Altos Unix, IBM AIX, Sun OS, DG/UX, and HP-UX. In addition, ReForm supports most accounting and database software including SBT, RealWorld, Great Plains, AppGen, FourGen, State of the Art, Informix, Oracle, Progress, and Ingress.

Contact Xpoint Canada, phone: (404) 246-4493.

This new release of Source Code Manager combines UNIX X Windows functionality with SCM's file access management, release revision tracking, and easy program administration. SCM keeps all files available to all programmers at all times, the company notes.

The Modification Request System is designed to allow programmers to customize the flow and path of modification requests, the priority of each request, modification request status reporting, and whether each source code change must be tied into the request system.

Source Code Manager for X is available for 9000 computers and others. It is priced at \$795 for one user, \$3,295 for five users, and \$5,995 for ten users. Site license pricing also is available.

Contact UniPress Software, Inc., 2025 Lincoln Highway, Edison, New Jersey 08817, phone: (908) 287-2100, fax: (908) 287-4929.

Expanded Database Support

Dynamic Information Systems Corporation (DISC) has announced that OMNIDEX, the database indexing system recently released to the DEC and UNIX platforms, has expanded its database support to include DEC's Rdb relational database and a broader implementation of Oracle support.

OMNIDEX is a software indexing

system that expands the single key indexing found in most databases to full multiple keyword indexing. The product can provide fast retrieval even for joined retrievals, where users need to find information that is qualified by data stored in separate, joined tables.

The Oracle and Rdb databases join RMS, flat files, and IMAGE as supported data structures. The company notes that it will be expanding the databases supported within the year to include all major relational databases. This database support will include the ability to update the indices in an operational database via programmatic calls.

OMNIDEX does not require a proprietary data structure, but indexes data in the native database format. Records are qualified at up to a quarter million records per second, the company notes. Selections can then be viewed or further refined with additional criteria. The indices themselves use a compression technique to minimize the disk storage space required.

Originally written for the HP 3000, OMNIDEX is now available for HP 9000s and other UNIX platforms. Licenses average \$9,000 to \$57,000, depending on CPU.

Contact DISC, 5733 Central Avenue, Boulder, Colorado 80301, phone: (303) 444-4000.

Database Administration

Dimeric Development Corporation has announced the latest release of its database administration toolset, easyDBA, for use on ORACLE 7 relational databases. Database administration tasks are performed without SQL scripts, commands, or forms, notes the company. Three modules comprise the toolset: Executive, Sleuth, and Table Editor.

The easyDBA Executive environment replaces the SQL*Plus command line. Database administration may be performed without knowing SQL or the underlying data dictionary.

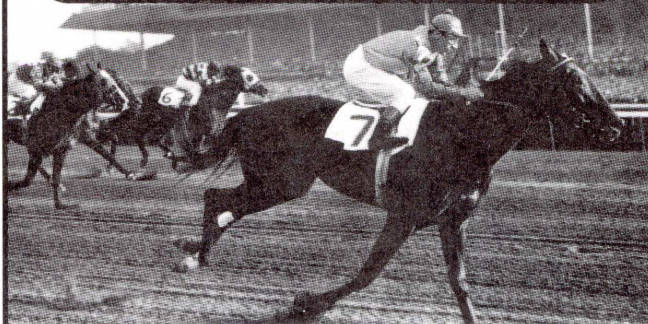
easyDBA Sleuth is designed to allow DBAs to perform complex space management, structural analysis, and capacity planning by using a sophisticated data collection program. Sleuth determines the fastest way to collect statistics, based on user-entered criteria (scenarios), and lets the user quickly identify only those objects in the database that have problems like chaining, fragmentation, or over-allocation. Dozens of reports are provided to give the DBA complete statistics in hardcopy format.

easyDBA Table Editor is intended to allow all levels of users quick and easy access to their tables, with privileged users having the ability to make quick ad hoc changes to their Oracle tables in worksheet style.

Shipments of easy DBA Release 3 are now available on HP 9000s running HP-UX Version 8.X or 9.X. Pricing ranges from \$999 to \$6,499. All three easyDBA products may be purchased separately or as a set.

Contact Dimeric Development Corporation, 22020 Clarendon Street, Suite 204, Woodland Hills, California 91367, phone: (818) 710-1112, fax: (818) 710-1058.

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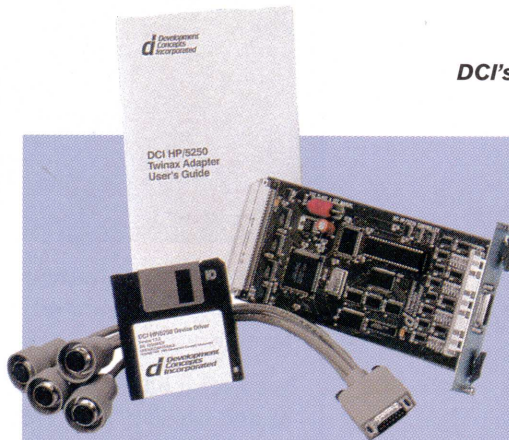
System Administration

OPENSERVICE SJI, Inc. has introduced four new applications for SYSTEMWatch AI-L (Artificial Intelligence Language), its automated early-warning, early-action software package for UNIX operating systems. The new modules are designed to enable automation of routine system administration tasks at the host level.

The new applications consist of a file system and disk manager, for tracking file and disk usage behavior, identifying potentially dangerous growth patterns, and taking action to avoid critical congestion; a swap and memory manager, for monitoring virtual memory and swap space and automatically increasing swap space when existing space approaches capacity; a CPU and resource manager, for identifying runaway processes or other problems that may impede efficient CPU operation, then initiating automated actions such as temporary stopping, reprioritizing, or killing processes to manage system load; and a daemon manager, for controlling background processes and averting such crises as electronic mail failure, print queue slowdown, or communications breakdowns.

SYSTEMWatch AI-L is governed by expert system and special behavior-modeling algorithms for monitoring printers, file systems, mail queues, backups, system performance, security, user processes, customer applications, and databases. When problems are detected, the product is designed to alert the system administrator, make recommendations for remedial action and, in some instances, take actions.

Cost for the SYSTEMWatch AI-L client package is \$395 per host and \$7,995 for the system administrator's



DCI's HP/5250 Twinax Controller

Twinax Devices Migration

Development Concepts Incorporated (DCI) has announced its 5250 Twinax Controllers and Twinax Terminal Servers. Initially developed to allow users to migrate from IBM System/3X and AS/400s to IBM's RS/6000, the product line has

been expanded to include support for HP 9000 Series 800 systems and for remote installations. Working closely with research and development teams to ensure that the new product met expectations and conformed to HP 9000 Series 800 NIO bus, DCI created the DCE HP/5250 product. HP anticipates significant demand for DCI's solution in the marketplace, notes DCI.

Users install the DCI HP/5250 board in existing 5250 terminals to use these terminals, printers, and Twinax when migrating to HP 9000 systems. Available in either two- or four-port models, the DCI controller products support up to 14 to 28 Twinax devices, respectively, and include system software. According to DCI, an HP 9000 Series 800 can support up to 16 DCI HP/5250 cards, totaling 448 devices. In this configuration, the 5250 terminals emulate IBM 3151 ASCII terminals. Existing Twinax cabling connects to the DCI Twinax adapter cable provided with each controller product. The adapter cables are provided with two or four installed Twinax port connectors (each one supporting up to seven devices per port).

For system configurations requiring remote support, DCI offers a series of Twinax Terminal Servers that operate in X.25, Point-to-Point Protocol (PPP), or Ethernet environments. These servers also can be used locally to support Twinax peripheral attachment to any TCP/IP-capable host. Server configurations include 1-, 2-, and 4-port models.

DCI HP/5250 controllers are immediately available and cost \$3,000 for the 2-port card and \$3,900 for the 4-port card.

Contact Development Concepts Inc., 730-D Louis Drive, Warminster, Pennsylvania 18974-2829, phone: (215) 443-9652, fax: (215) 674-0607.

system management console. The new applications are shipped with the core technology. Site licensing for system management consoles and run-time versions is available.

Contact OPENSERVICE SJI, Inc., 9428 Baymeadows Road, Suite 132, Jacksonville, Florida 32256, phone: (904) 645-1801.

Telephone Access to Host

Frank Solutions, Inc. has introduced its Quicklink interactive voice responsive (IVR) products for the HP 3000 and 9000. IVR is designed to enable callers to access information from an HP host computer through a touchtone telephone. It is designed to provide full connectivity

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to the HP host for a real-time source of data and transactions.

IVR applications presently include account balance retrieval, product availability, time sheet data entry, human resource data inquiry, course registration, financial transactions, and fax on demand.

The Quicklink voice system is designed using WRQ's Reflection software to access the HP host data. As a workstation running Reflection, Quicklink sends requests to the host for data, which are converted into voice responses that can be retrieved by the caller. This approach is designed to provide stable, flexible, and low-cost voice/host integration. Pricing is based on volume and starts at \$8,000.

Contact Frank Solutions, 9250 E. Costilla Avenue, Suite 100, Englewood, Colorado 80112, phone: (303) 792-5500, fax: (303) 799-3621.

Publication Automation with Kanji

DataBase Publishing Software, Inc. (DPS) has announced SmartLeaf Kanji, designed to automate the publication of Japanese-language and multilingual documents such as proposals, illustrated parts catalogues, and technical documentation.

SmartLeaf Kanji is a version of DPS's SmartLeaf, designed to automate the publication of presentation-quality documents by integrating popular publishing software with virtually all of the widely used relational database systems. SmartLeaf links document objects directly to stored database objects so that as the stored data changes, the document contents change as well. As a result, SmartLeaf eliminates the manual process of re-entering, filtering, cutting, and pasting, the company notes.

The application processes Japanese Kanji text just as it processes text in any other supported language. Users can

Raid Disk Arrays

Mega Drive Systems, Inc., has announced the MR/5 RAID Disk Array, which supports RAID Levels 0, 3, and 5 using a Fast and Wide SCSI-2 interface to provide fault-tolerant mass storage for PCs, Macintoshes, workstations, and LANs. The product works with HP 9000 Series 700s.

Mega Drive features a push-button programmable array, through which a user can configure the unit and monitor the status of drives, power supplies, fans, and components. On-screen programming provides additional user control of other functions, including built-in diagnostics or on-the-fly drive reconstruction.

The array's Mercury Removable Hard Drive System is designed to provide reliable hot swapping and can be configured from 2.1 GB to over 10 GB using any of the fully enclosed, shock-mounted, Mercury Drive Modules from 535 MB to 2.1 GB. Other features include 20 MB/second Fast & Wide SCSI-2 data transfer rate; Intel i960 RISC-Based RAID Controller; redundant, hot-swappable hard drives, power supplies, and fans; up to 128 MB cache; optional tape backup module; optional pager notify module; and optional spare drive.

The suggested price of the Mega Drive MR/5 starts at \$9,560 and varies depending on storage configuration and optional equipment. The unit is part of Mega Drive's MR/RAID line of fault tolerant, high-performance disk arrays. MR/RAID systems are available in tower or rack-mount configurations with storage capacities up to 490 GB.

Contact Mega Drive Systems, Inc., 489 S. Robertson Blvd., Beverly Hills, California 90211, phone: (310) 247-0006, fax: (310) 247-8118.



enter Kanji text directly into Interleaf documents and use existing Kanji data from relational databases. Its user interface features English menu commands and dialogues, but users can add menu choices that display Kanji characters. SmartLeaf Kanji supports Kanji, Hirigana, and Katakana character sets.

The current release of SmartLeaf Kanji runs on most UNIX-based hardware platforms, including those from HP. It supports Interleaf 5 publishing software and most relational database platforms that support Kanji (in EUC format), such as Oracle.

Contact Database Publishing Software, Inc., 400 W. Cummings Park, Suite 5300, Woburn, Massachusetts 01801, phone: (617) 938-0018, fax: (617) 938-3810.

Network Connectivity

KnowledgeNet has announced Net/WrkHP, designed to provide seamless integration between multiple HP-UX machines and between HP-UX platforms and AS/400, OS/2, RS/6000, System/36, or DEC VMS platforms running KnowledgeNet's other Net/Wrk products.

Net/WrkHP operates across Advanced Program-to-Program Communications/Advanced Peer-to-Peer Networking and TCP/IP backbones using a simple command language. The product is designed to offer bi-directional file transfer and remote program execution across similar and dissimilar hardware platforms. Net/WrkHP also supports Dynamic SQL for accessing and updating subsets of data

Interex '93 Conference Proceedings

The Conference Proceedings are a great way for HP users to capture all the information available at the conference. The proceedings from Interex '93 in San Francisco contain final paper presentations of all scheduled sessions. If you were unable to attend the conference, you can catch up on all the sessions you would have liked to attend. All CSL/Site-level members who did not attend the conference automatically received a copy of the proceedings following the event, but additional copies are available.

Proceeding rates are as follows:

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on remote workstations.

The Net/Wrk Scheduler is designed to enable scheduling of unattended execution of all network functions, and the API Tool Kit is designed to enable embedding Net/WrkHP commands into existing applications. Net/WrkHP even supports the ability to send spooled files in an output queue, such as a series of printouts, across different platforms.

Data compression is provided to improve throughput, reduce line time, and trim costs. The product uses in-stream automatic data conversion to eliminate the need for additional hardware. Net/WrkHP also includes plain-English error messages for easy troubleshooting, network failures, a Net/Wrk Status Monitor for displaying current communications activity, a communications history for reviewing the activities and connect times of any session, and detailed online help.

Contact KnowledgeNet, 1260 W. Northwest Highway, Palatine, Illinois 60067, phone: (708) 705-0400 or (800) 292-0127.

Text Editor

a/Soft Development, Inc. has announced nu/TPU v4.0, an update to its customizable text editor. nu/TPU's interface has been totally rewritten for faster performance and easier-to-create extensions. This new interface is intended to give end users much more flexibility when customizing the editor.

The v4.0 windowing system provides programmability with X and MS-Windows environments. The text editor's windowed environments are now completely user-definable; users can customize the status-line buttons, menu bar, pull-downs and pop-ups, colors, fonts, and scroll bars from within the editor, the company notes.

Graph Layout Toolkit

Tom Sawyer Software Corporation has introduced new products for the Graph Layout Toolkit, which contains portable topology-management products designed to improve the graphics output of application programs. The product supports HP 9000s and other UNIX platforms, as well as PC operating systems. It is designed to provide real-time, automated, graph layout services through a family of class libraries written in C++ that include ANSI C APIs. The toolkit can save a development group two to three years of highly algorithmic development, the company notes.

Bundled directly into an application, the Graph Layout Toolkit is designed to improve graph output without extensive changes to code and to simplify product use. The toolkit initially supported Hierarchical Layout, which is intended for use with project management software, compiler and software development tools, data inspection software, workflow software, reverse-engineering applications, and database schema viewers. The toolkit now also supports Circular and Symmetric Layout libraries, which are designed specifically for the network management, design, and simulation markets.

Tom Sawyer Software is incorporating the Graph Layout Toolkit into end-user network mapping products that are based on industry standards. The products include SunNet Manager, HP OpenView, and IBM NetView/6000.

The Graph Layout Toolkit is priced at \$16,000 and provides unlimited distribution for one product on one platform. Royalty-based pricing is also available.

Contact Tom Sawyer Software, 1824B Fourth Street, Berkeley, California 94710, phone: (510) 848-0853, fax: (510) 848-0854.

The product's memory management now allows large files to be edited without contiguous memory allocation, which is said to greatly speed character manipulation in these files. Version 4.0 has added multiple scroll bars for each window, making cursor movement quicker and easier to toggle. Buffer names are now case-sensitive, and unlimited undo is designed to enable users to retrace their commands as far back as they like. Support for more than 50 additional windowed built-ins has been added, and a number of non-windowed built-ins also have been added.

nu/TPU also features unlimited windows and buffers, rectangular box operations, a dynamically built help facility, command-line abbreviations, shell and spawn capability, and word wrap.

nu/TPU is available for HP 9000s and

other systems, as well as on PCs. Product pricing starts at \$499 for UNIX and at \$199 for DOS.

Contact a/Soft Development, Inc., One Executive Park Drive, Bedford, New Hampshire 03110-6913, phone: (603) 666-6699, fax: (603) 666-6460.

Low-Cost X Terminals

Phase X Systems, Inc. has repositioned its CA series with new features and lower prices. The company has added new features to its X11R5 server software and reduced prices by as much as 15 percent. The CA series offers monochrome and color, medium to high-resolution X terminals, and support for HP-UX and other UNIX server operating systems.

The CA X Terminals feature an AMD-29000 RISC processor and a 64-MHz

Interex Group Discount at Maastricht Conference

Interex is offering a package plan to enable as many of its members as possible to attend **The International HP Users Conference, April 10-14**, at the Maastricht Exhibition & Congress Center, in Maastricht, The Netherlands. The Maastricht conference is sponsored by the Dutch Users Group (DUG) in cooperation with the Technical Systems Users Group.

Through special arrangements with KLM, the official Dutch airline, the Interex package includes round-trip airfare, conference registration, and housing during the conference. This package is available to Interex members for \$2,698 per person from Los Angeles or San Francisco. Packages at lower rates are also available from Chicago, Minneapolis, Detroit, Washington, D.C., and New York City.

For more information, contact Brenda Marple at Apex Travel at 800.366.1544. The fax number is 408.288.9264.

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ISAHK (Hong Kong):	Tel: 852 330-1977	Fax: 852 330-1077
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ASIC chip as a special graphics accelerator. The terminals offer over 65,000 X-Stones in graphics performance, and all are ISO-9001 quality certified.

The 19CA1 is a 19-inch monochrome model that offers 1,280 x 1,024 resolution and is priced at \$1,395. The price of the 15CA1, a 15-inch model with 1,024 x 768 resolution, was reduced from \$1,695 to \$1,495. The price of the 17CA1, a 17-inch model with 1,024 x 768 resolution, was reduced from \$1,995 to \$1,795. The price of the 20CA2, a 20-inch color model with 1,280 x 1,024 resolution, was reduced from \$2,995 to \$2,595. All prices include a one-year warranty and X server software.

The new features added to the CA series include Local Motif Window Manager, font server access, screen lock, low-memory dialogues, three-dimensional GUI setup windows, and remote configuration capabilities. The CA series supports DECnet interface and an XDM (X Display Manager) chooser list that allows users to log into various hosts. LAN connectivity is provided through Thin net and Thick net, Ethernet LAN interfaces, with an auto select LAN interface. The CA series features a serial and parallel port for supporting local peripherals such as printers.

Contact Phase X Systems, Inc., 19545 NW Von Neumann Drive, Beaverton, Oregon 97006, phone: (503) 531-2400 or (800) 845-4064, fax: (503) 531-2401, e-mail: info@phasex.com.

Image Processing Software

Mentalix Inc. has ported its image processing software Pixel!FX 2.5 to all major UNIX platforms, including the HP 9000 Series 700. Pixel!FX 2.5 adds several enhancements to the input, processing, and storage of image-based data,

including user-transparent links to FrameMaker and Interleaf publishing programs, support for additional input, output, and image-compression file formats, enhanced Optical Character Recognition (OCR) capabilities, integration with the earth science image processing application ER Mapper, and additional device and features support for Agfa, Howtek, and HP scanners.

Pixel!FX 2.5 integrates three standalone software modules: Pixel!SCAN, a high-performance interface to a variety of scanners; Pixel!VIEW, for displaying and translating images in a variety of file formats; and Pixel!EDIT, a comprehensive image enhancement and photo retouching application. Also available is Pixel!OCR, an optional package designed to enable scanned lineart to be accurately converted to text and imported into virtually any publishing or wordprocessing program for text editing.

The suggested price for Pixel!FX is \$1,599. Contact Mentalix Inc., 1700 Alma Drive, Suite 110, Plano, Texas 75075, phone: (214) 423-9377, fax: (214) 423-1145.

Open Systems Center

KELLY Computer Systems has announced the KELLY Open Systems Center, which sells the complete HP 9000 family of UNIX servers and workstations, as well as HP and KELLY memory, drives, and other options. The Configuration Center specifies, integrates, and tests systems, then ships them to the user's door in "plug-and-play" condition, the company notes. KELLY also offers migration services to companies in transition from proprietary legacy systems to the open systems environment. The company's Technology Finance Plan is designed to allow users to trade up to the latest technology at

fixed yearly intervals while maintaining a low monthly operating expense.

Contact KELLY Open Systems Center, 139 N. Whisman Road, Mountain View, California 94043, phone: (415) 960-1010, fax: (415) 960-3473, e-mail: kosc_info@kelly.com.

New from HP

OpenView OmniStorage

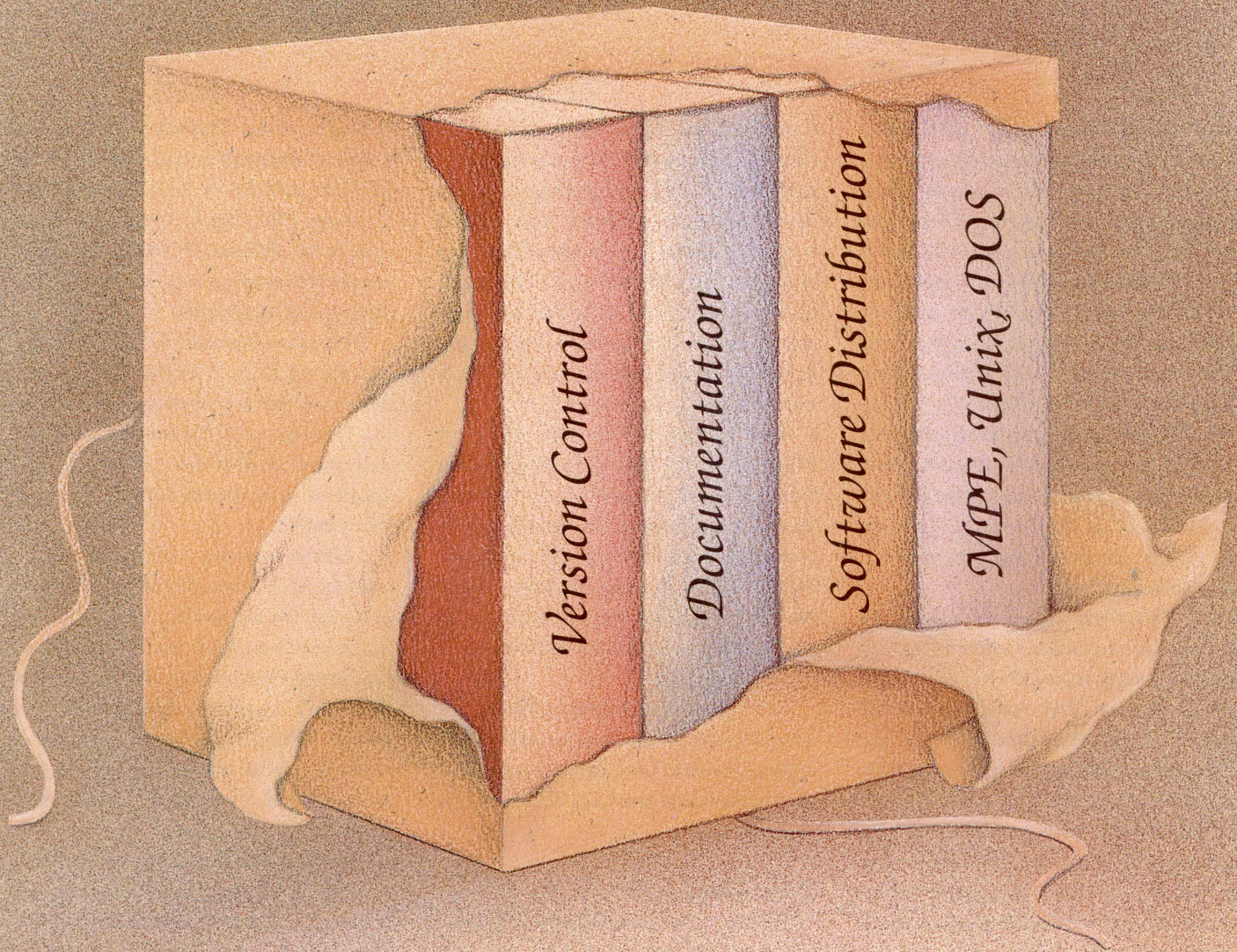
HP has introduced HP OpenView OmniStorage, a hierarchical storage-management application that expands HP's storage-management solutions. HP OpenView OmniStorage is a hierarchical storage-management (HSM) solution designed to offer all applications on networked systems virtually unlimited online storage capacity through automatic and transparent migration of files between magnetic disks and optical-disk libraries. The product is designed to operate unattended and to provide disaster recovery and rebuild capabilities. It supports multivendor clients through NFS.

Problem and error notifications from HP OpenView OmniStorage are reported automatically via a color change on the map of a remote HP OpenView OperationsCenter console. The product is complementary to HP OpenView OmniBack, providing storage management in environments ranging from several gigabytes to over a terabyte. HP OpenView OmniStorage is now available on HP 9000 Series 700 workstations and Series 800 business systems and servers. It is priced at \$12,000.

OmniBack Enhanced

HP also announced that its leading backup applications, HP OpenView OmniBack and HP OpenView OmniBack/Turbo, have been enhanced to

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 **Diamond Optimum Systems, Inc.**

support a broader range of backup devices to better address the requirements of customers migrating to client-server environments. HP OpenView OmniBack now supports 3480-compatible 1/2-inch tape drives and 8-mm Exabyte devices on HP 9000 Series 800 systems. In addition, SAP's popular R/3 business applications have been integrated with HP OpenView OmniBack and OmniBack/Turbo for online backup and 24-hour availability of R/3 databases. R/3 is designed to allow customers to link critical business functions, such as accounting, human resources, manufacturing, personnel, sales, and distribution.

HP OpenView OmniBack is designed to allow users to manage multiple backup domains from a single HP OpenView management station. The combination of HP OpenView OmniBack with HP OpenView OperationsCenter extends enterprise-wide problems-management to include the handling of backup-related events. This solution improves system administrators' productivity through single-point exception handling and sitewide access to applications on the network.

OmniBack is priced at \$3,200, and OmniBack/Turbo is priced at \$5,200. Both are available now.

Software Distributor Supports Sun

HP also announced that OpenView Software Distributor is available on the Sun platform (SunOS 4.1.3). This software is designed to perform all functions of software management for both HP and Sun systems from a single OpenView console.

HP OpenView Software Distributor is intended to automate the distribution and management of software. This toolset performs pre-installation compatibility checks, distribution, inventory, update, and removal of software to

computer systems across a company's distributed network. The package also includes utilities for "packaging" software, setting up software distribution points ("depots"), and controlling user access to installed software. The application allows users to "push" or "pull" software down from servers, supporting both centralized and autonomous end-user management models.

The initial version of Software Distributor is the base technology for the Open Software Foundation's Software Distribution Services. The product specification serves as the base document for the POSIX draft standard for software administration. HP plans to add support for PC LAN and IBM AIX environments in future releases.

HP OpenView Software Distributor uses HP OpenView Operation Center's enterprise-wide problem-management capabilities. It is priced at \$2,250 and is available now.

SNAPplus Release 3.0

HP also announced SNAPplus Release 3.0, the latest release of HP's comprehensive IBM networking product suite, which is designed to enhance HP 9000 Series 700 and 800 integration with IBM host environments. Release 3.0 improves the local language support for Asia/Pacific and Middle Eastern users, adds the standard CPI-C interface for distributed online transaction processing, and enhances SNAPplusLink service over an X.25 backbone network.

Support of the Common Programming Interface in C (CPI-C) provides a higher-level programming interface for distributed applications using LU6.2. CPI-C is designed to ease application portability and reduce application development time. SNAPplus3270

contains 16-bit NLS support for 3270 terminal emulation in Japanese (JIS0201, JIS0208, and 2-byte EUC), traditional Chinese, HIC, Big 5, and Korean languages. In addition, ISO 8859.1 provides terminal emulation support for Hebrew right-to-left languages.

Permanent Virtual Circuit (PVC) support for QLLC in SNAPplusLink enables users to define the equivalent of a leased line through an X.25 connection and is intended to provide the user a pre-assigned, guaranteed connection over the network.

Utilities now are available to download the SNAPplus configuration file into a flat text file for modification and then to convert it back for use. Text file configuration is intended to ease the process of making configuration changes for remote systems and large, replicated sites. In addition, substantial performance enhancements have been made to SNAPplusRJE.

SNAPplus Release 3.0 was scheduled to ship in February 1994. Pricing will remain the same as SNAPplus Release 2.0. SNAPplusLink pricing starts at \$3,300; SNAPplus3270 starts at \$850, SNAPplusRJE starts at \$1,300, and SNAPplusAPI starts at \$1,600. ■

Attention vendors: New product announcements should be sent to New Products Editor; hp-ux/usr Magazine, Interex, P.O. Box 3439, Sunnyvale, California 94088-3439, USA.

Deadline for submission is two months prior to publication.

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